



EC5000 Series AC Motor Driver

User Manual V2.1

Manufacturer:

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Introduction

Thank you for using EC5000 Series AC Motor Driver. EC5000 Series is a high-performance / low noise general-purpose AC motor drive, manufactured using high-quality components and incorporating the latest micro-processor technology available.

This manual describes the matters relevant to the installation, parameters setting, abnormality diagnosis and solution, and the daily maintenance of the AC motor driver that need attention of the users. In order to ensure the correct installation and operation of the motor driver, please carefully read this manual before the installation, properly keep it and give it to the machine users.

AC motor driver is a precise electric and electronic product, thus for the safety of the operators and the equipment, please ensure that the installation and parameters adjustment is done by professional motor engineers, and the content marked as "Danger", "Notice", etc in this manual must be read carefully. If you have any questions, please contact with the agents of our company, and our technicians are ready to serve you.

The matters that specially need attention are as follows:

Danger!

1. The power supply must be turned off when laying the wires.
2. When the AC power supply is cut off but the indicator light of the manipulator of AC motor driver is still on, there is still high voltage in the AC motor driver which is very dangerous, please do not touch the interior circuit and components.
3. Do not modify the interior components or circuit of AC motor driver by yourselves.
4. Never connect the main circuit output terminals U, V, and W directly to the AC main circuit power supply as this will damage the drive.
5. The terminal of AC motor driver must be grounded correctly.
6. This series of AC motor drivers can't be used for the occasions related to personal safety, e.g. the life maintaining equipment.

Warning!

1. Please do not test the voltage resistance of the interior components of the driver, as the semiconductor of the driver is easy to be punctured and damaged by high voltage.
2. The circuit board of the driver has CMOS IC which is extremely easy to be damaged by static electricity, thus please do not touch the circuit board with your hand before taking anti-static electricity measures.
3. Even if the motor is inactive, the main loop terminal of the driver may still have dangerous high voltage.
4. Only the qualified motor professionals can install the driver, lay the wire, repair and maintain the driver.

Notice!

1. When certain functions of the driver are set, the motor may immediately start after the power input.
2. Please choose a safe place to install the AC motor driver to avoid the high temperature, direct sunlight, humidity and splash of water drops.
3. Please prevent the children or irrelevant people against being close to the AC motor driver.
4. The AC motor driver can only be used in the places recognized by our company, and the usage in an environment not recognized by our company may lead to fire, gas explosion or electrification.
5. When the wire between the AC motor driver and the motor is too long, the inter-layer insulation of the motor may be damaged, please use the special AC motor for AC motor driver, or add a reactor between the driver and the motor to prevent the AC motor from being burned due to the damage of insulation.
6. The rated voltage of the power system for the driver can't be higher than $\pm 15\%$ of the rated voltage of product, and the current can't be over 5000A RMS (The current of 40HP (30kW) type or above can't be over 10000A RMS).

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1.1 Delivery Inspection

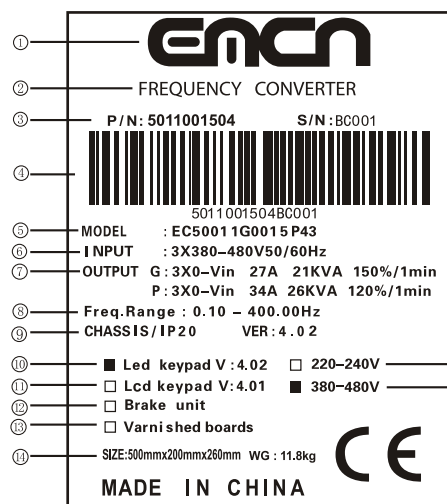
Every EC5000 AC motor driver has pass by strict quality management before delivery, and been packed to enhance its collision resistance. The customer should immediately inspect the following inspection steps after unpacking the AC motor driver.

◆ Check whether the AC motor driver is damaged during the transportation.

◆ Check whether the type and model of the AC motor driver are consistent with the information on the package.

For any inconsistency between the received product and your order, or any problem of the product, please contact with our agents or distributors that sold you the product.

Description of the label of package



1. Trademark of product
2. Name of product
3. Serial number of production control
4. Barcode
5. AC drive Model
6. Input power Spec.
7. Output power Spec.
8. Output frequency Range
9. Protection grade, version of mainboard
10. LED manipulator
11. LCD manipulator
12. Interior brake unit
13. Specification of 220V voltage
14. Specification of 380V voltage
15. Dimensions of exterior package, total weight

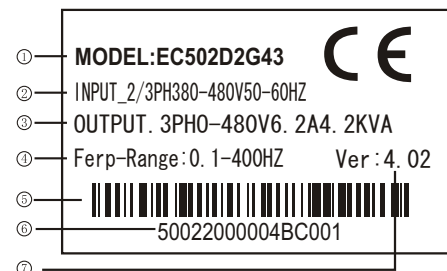
Notice!

The black squares of 10-14 are the configurations of the ac motor drive.

Description of the label of product

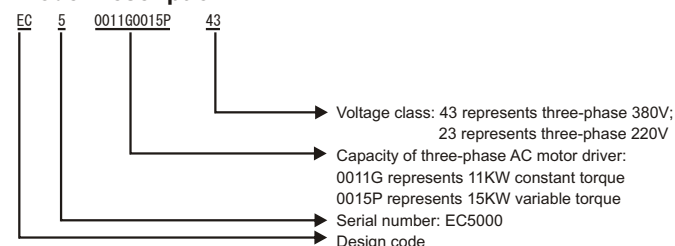
EC500D4G23~EC502D2G23

EC50D75G43~EC50560G0630P43



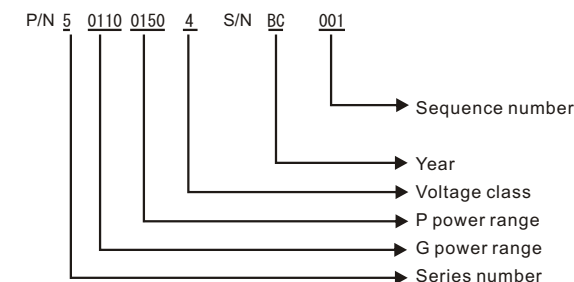
1. AC drive Model
2. Input power Spec.
3. Output power Spec.
4. Output frequency Range
5. Barcode
6. Serial number of production control
7. Power card Versions

Model Description



EC is the abbreviation of our company name "EACN".

Description of Serial Number



1.2 Transport

This product is a precise device, please handle it with care during the transport, prevent it from severe collision.

1.3 Storage

This product must be in the packing box before installation. If it won't be used for a period, in order to keep it within the warranty of our company and for the future maintenance, the following matters must be paid attention to for the storage:

- ✓ The product must be put in a dust-free and dry place.
- ✓ The temperature of the storage place must be $-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$.
- ✓ The relative humidity of the storage place must be 0%-95% without frost.
- ✓ Avoid putting the product in an environment with corrosive gas or liquid.
- ✓ It is better to put the product on a shelf or stand with a proper package.

Notice!

1. Even if the humidity meets the requirements of the criterion, if the temperature changes quickly, moisture condensation or icing may also happen, thus the product should not be stored in such place.

2. Do not put the product directly on the ground, but on a proper stand. If the surrounding environment is very bad, desiccant should be put in the packing bag. 3. When the storage period is longer than

3 months, the surrounding temperature should not exceed 30°C , because the electrolytic condenser is stored with power off, and it will easily degrade if the temperature is high.

4. When the AC motor driver is installed in the installation or control

panel but isn't used, especially in the construction sites or the wet places with lots of dust, the AC motor driver should be removed and put in a proper environment satisfying the storage requirements mentioned above.

5. The electrolytic condenser is easy to degrade with power off for a long term. Please do not store the electrolytic condenser with power off for more than one year.

1.4 Considerations for choices of ac motor drives

1. Use large capacity above 600 kva electric current transformer and capacitor into phase, voltage input side surge current is too large, that could undermine the input side of ac motor drives. At the moment the input side must be installed an ac reactor, in addition to reduce the current, and improve the effect of the input power.

2. To actuate the special ac drive or one ac drive actuate several motors, the total rated current of the motor 1.25 times can't exceed the rated current of the ac motor drive. It is very careful to choose the ac motor drive.

3. When the ac motor drive actuate the motor, the startup, the accelerate and decelerate are limited by the rated current of the ac motor drive. The starting torque is small (commercial power directly start 6 times when start current, when the ac motor drive starting, the starting current can't exceed two times), so when the ac motor drive use for high torque place (For example Elevator, Blender, Machine tool ect), the ac motor drive must increase one or two grade. The optimal way is increasing one grade of the motor and the ac motor drive at the same time.

4. To consider that when the ac motor drive break down and stop the output, the stop mode for the motor and the mechanical equipment, if they need sudden stop that must install the mechanical brake.

Parameter setting

1. Because of the highest speed for the digital operation can reach to 400Hz, so when it use in the highest speed place, it can use the speed limit function limit the output frequency.

2. When the dc braking voltage and the braking time setting too highly, that may cause the motor overheating.

3. The time for the motor accelerate and decelerate is decided by the motor rated torque, load torque, load inertia ect.

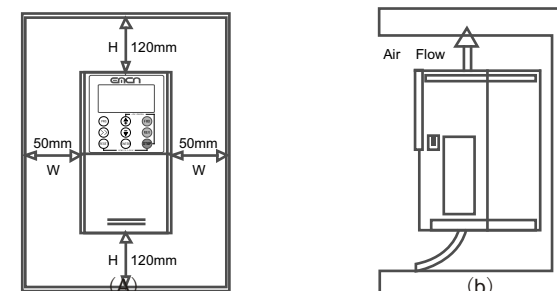
When the antistall (STALL) act in the accelerate and decelerate, please extend the accelerate and decelerate time. If the accelerate and decelerate must be very fast, and also the inertia load is very big, the ac motor drive can't speed up or stop the motor in requirement time, that must install the braking resistance (only can shorten the deceleration time) or increase the grade of the motor and the ac motor drive at the same time.

2.1 Installation Environment

Please install the AC motor driver in the following environment to guarantee the usage safety of the product:

Operating Environment	Ambient temperature Relative humidity Pressure Installation height Vibration	-10 ~ +50°C (14 ~ 122°F) for UL & cUL without anti-dust cover <90%, without frost 86 ~ 106 kPa <1000m <20Hz: 9.80 m/s ² (1G) max 20~50Hz: 5.88 m/s ² (0.6G) max.
Storage and Transport Environment	Ambient temperature Relative humidity Pressure Vibration	-20°C ~ +60°C (-4°F ~ 140°F) <90%, without frost 86 ~ 106 kPa <20Hz: 9.80 m/s ² (1G) max 20 ~ 50Hz: 5.88 m/s ² (0.6G) max.
Degree of Pollution	Class 2: suitable for factory environment	

2.2 Conditions for Installation



Install the AC drive vertically to provide proper ventilation. Adequate space is required between the drive and a wall or other equipment. The figure below shows the minimum space needed. All enclosures must provide adequate ventilation and the internal ambient temperature must be kept at 40°C or below.

Notice!

The AC drive should be installed in an environment that is:

- ✓ protected from rain or moisture;
- ✓ protected from direct sunlight;
- ✓ protected from corrosive gases or liquids;
- ✓ free from airborne dust or metallic particles;
- ✓ free from vibration;
- ✓ free from magnetic noise
- ✓ temperature: -10°C to +40°C; R.H.: 0% to 90%; air pressure: 86kPa to 106 kPa

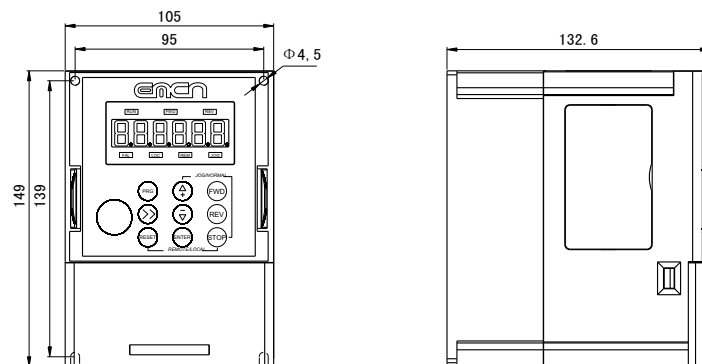
Violating the conditions listed above may void the warranty!

2.3 Installation dimension of AC motor driver

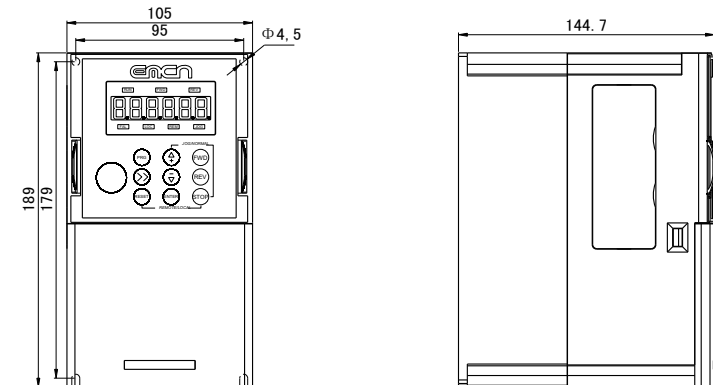
2.3.1 200V Installation dimension of AC motor driver

unit:mm

Frame10: EC500D4G23B、EC50D75G23B



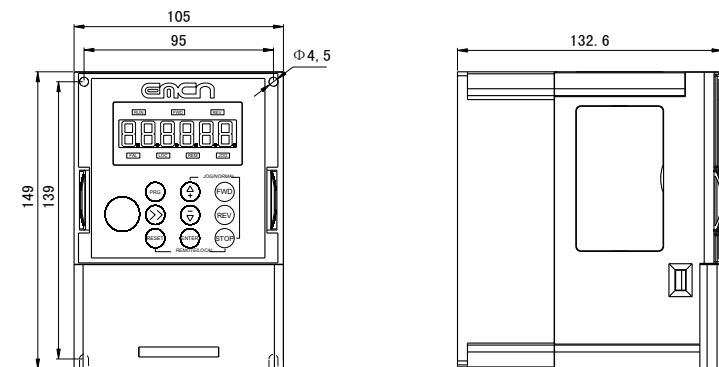
Frame11: EC501D5G23B、EC502D2G23B



2.3.2 400V Installation dimension of AC motor driver

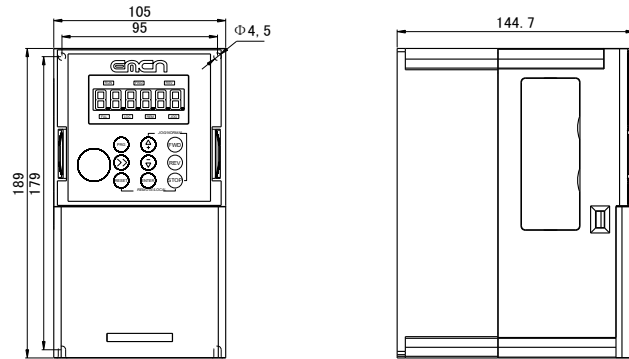
unit:mm

Frame10: EC50D75G43B、EC501D5G43B

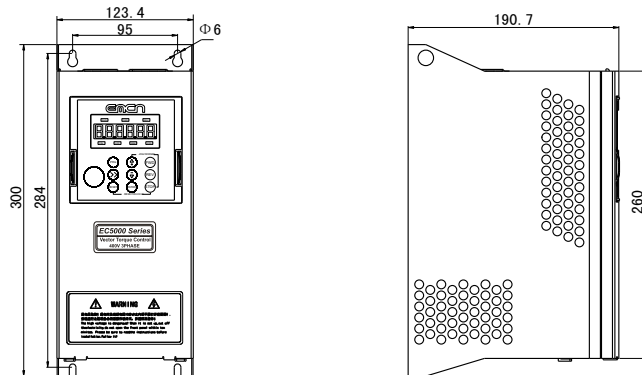


unit:mm

Frame11: EC502D2G43B、EC503D7G43B

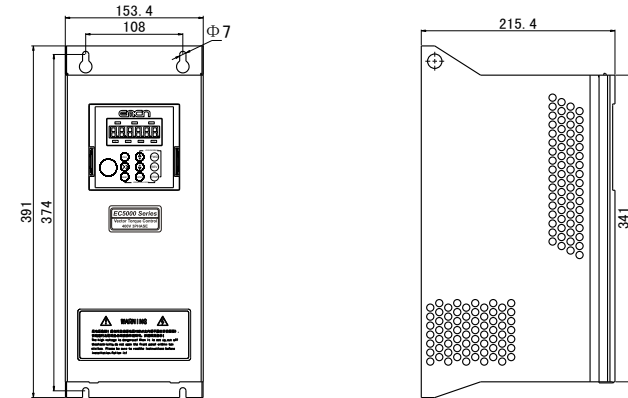


Frame20 : EC505D5G07D5P43B、EC507D5G0011P43B

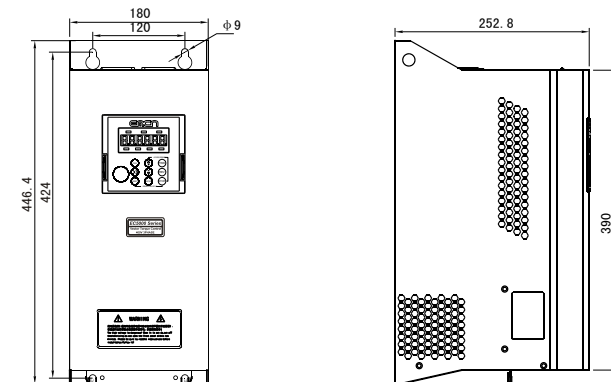


unit:mm

Frame30:EC50011G0015P43B、EC50015G18D5P43B

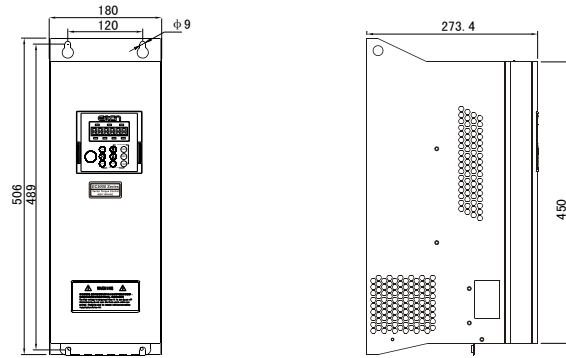


Frame40:EC518D5G0022P43B、EC50022G0030P43B

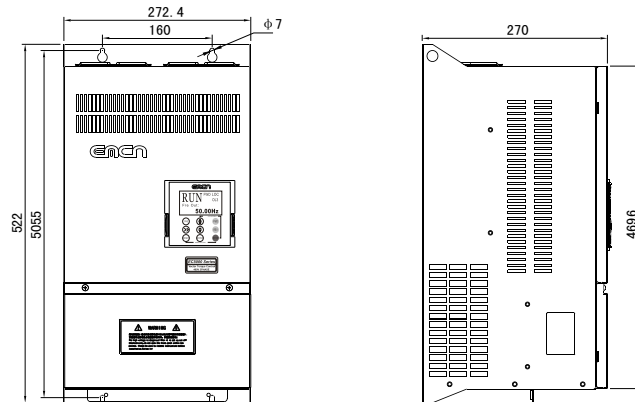


unit:mm

Frame50:EC50030G0037P43B、EC50037G0045P43B

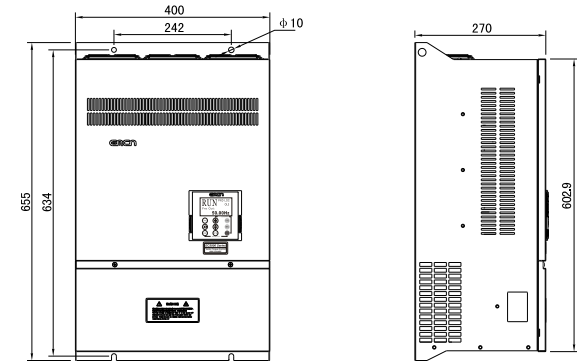


Frame60:EC50045G0055P43B、EC50055G0075P43B

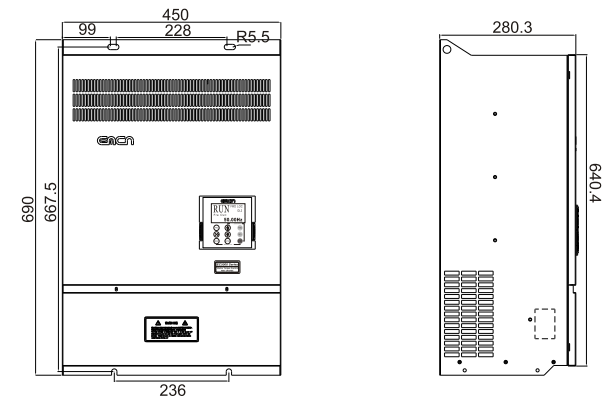


unit:mm

Frame70:EC50075G0090P43B、EC50090G0110P43B

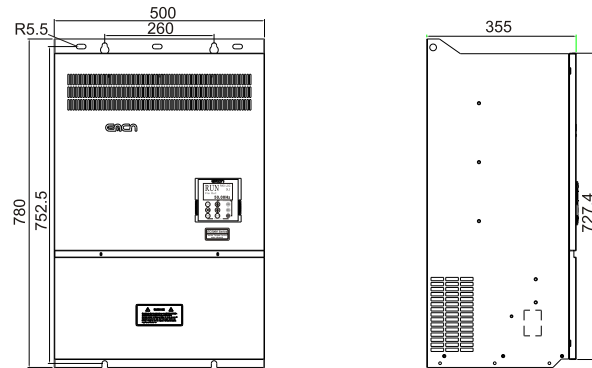


Frame80:EC50110G0132P43B、EC50132G0160P43B

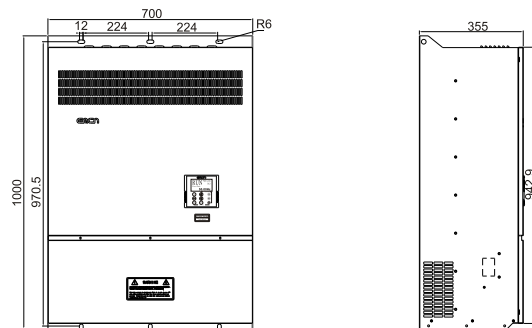


unit:mm

Frame90:EC50160G0185P43B、EC50185G0220P43B、
EC50220G0250P43B



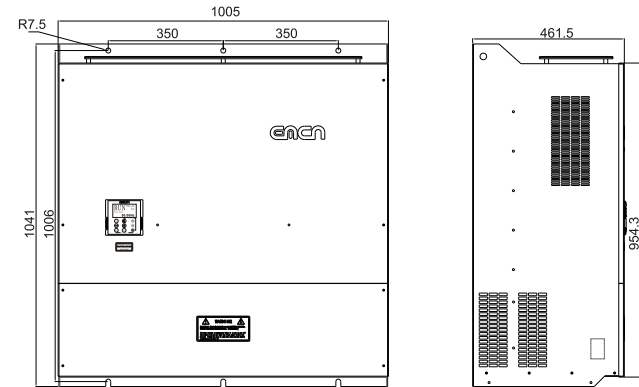
FrameA0:EC50250G0280P43B、EC50280G0315P43B、
EC50315G0350P43B、EC50350G0400P43B



Notice: The base is optional

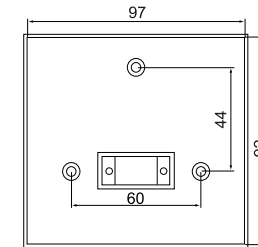
unit:mm

FrameB0:EC50400G0450P43B、EC50450G0500P43B、
EC50500G0560P43B、EC50560G0630P43B



Notice: The base is optional

Dimension of the installation hole on the external frame of operation panel



Installation Hole Size: 97mm*92mm

2.4 Instruction for Wire Layout

After removing the upper cover, the connection terminal strips are exposed, check whether the terminals of main loops and control loops are marked explicitly and pay attention to the following instructions during connection, do not make improper connections.

2.4.1 Basic Wire Layout

■ The power supply must be connected with the terminals of the main loops of AC motor driver R/L1, S/L2, T/L3. If the power supply is improperly connected with other terminals, the AC motor driver will be damaged. Besides, check whether the voltage/current of the power supply is within the allowable range indicated on the nameplate.

■ The grounding terminals must be grounded well, on the one hand it can prevent electric shock or fire, and on the other hand it can reduce the noise interference.

■ Connect the terminals with wires, ensure the high reliability of the connection.

■ After finishing the wire layout, check the following things:

1. Are all the connections correct?
2. Is there any connection left out?
3. Is there any short circuit or line-to-ground short circuit between the terminals and the connecting wires?

When the power is on, if the connections need to be changed, first the power supply should be turned off, and the filter capacitor of the DC part of the loop will need some time to discharge electricity. The work only can begin after the completion of electricity discharge. Besides, because of the residual voltage, sparks may be generated when there is a short circuit, thus it's better to conduct the work under voltage-free conditions.

Notice!

1. Grounding wire must be connected, or electric shock or fire may happen.

2. The wiring work should be done by the professional technicians.

3. Start the work after confirming that the power is OFF or electric shock may happen.

Basic Wire Layout Graph

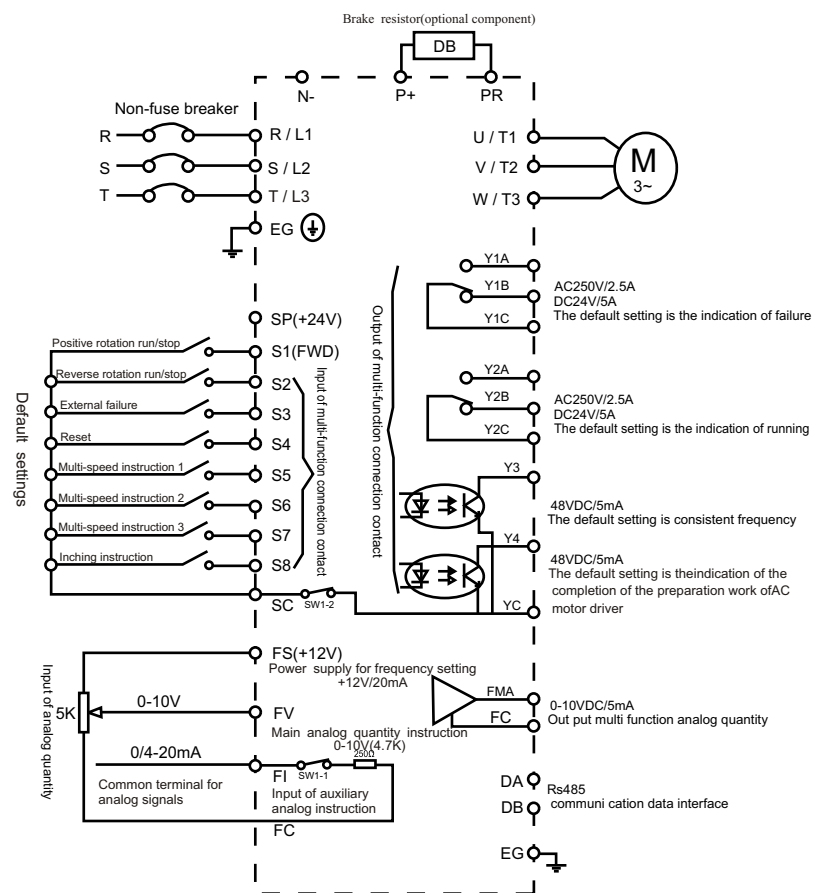
The wires of AC motor driver can be divided into main loop and control loop. Users can open the upper cover and see the terminals of main loop and control loop. Users must lay the wires according to the figure below to ensure the accuracy of connections.

Notice!

During the wiring, the selection of the specification of wire diameter should be in accordance with the standards of electrical engineering for safety. The screws of the terminals should be tightened, preventing the sparks caused by loose screws due to vibration. The standard wire layout figure for EC5000 AC motor driver is shown below.

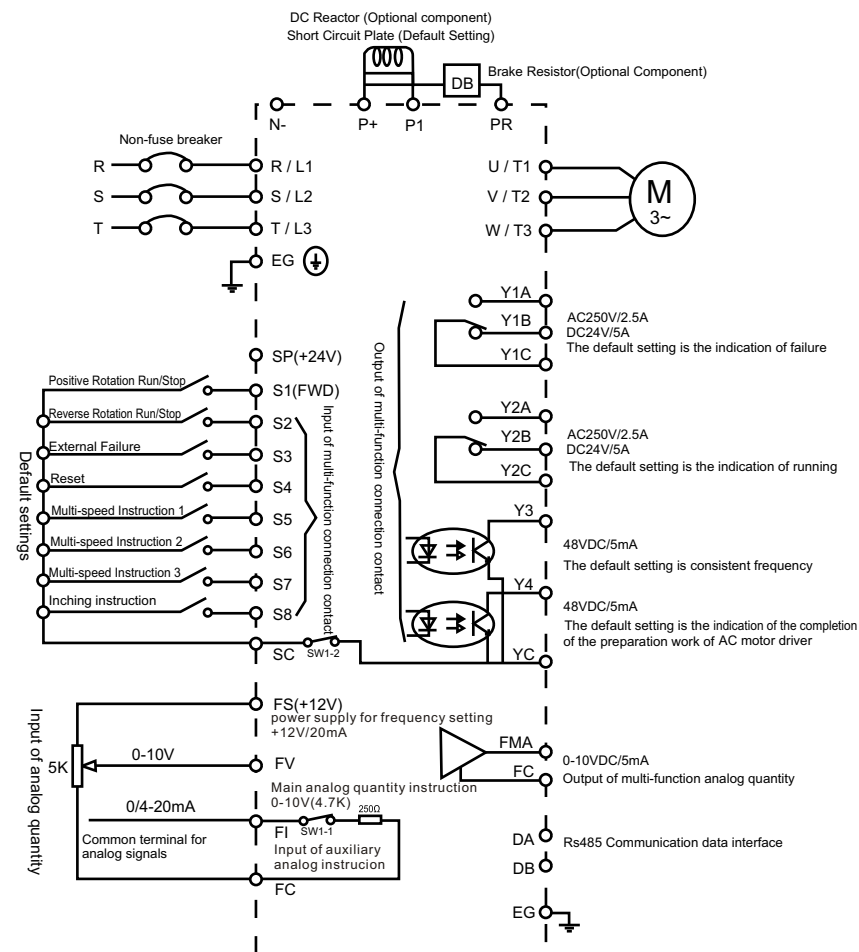
Basic Wiring Diagram1

EC500D4G23B~EC502D2G23B、EC50D75G43B~EC503D7G43B



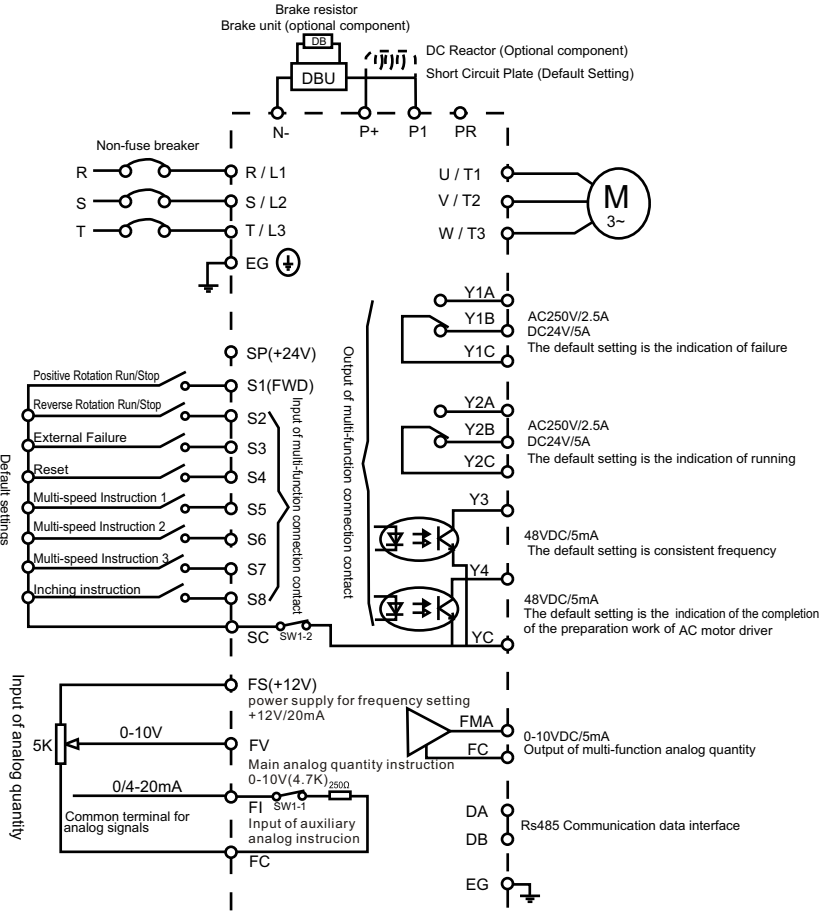
Basic Wiring Diagram 2

EC505D5G07D5P43B~EC50015G18D5P43B

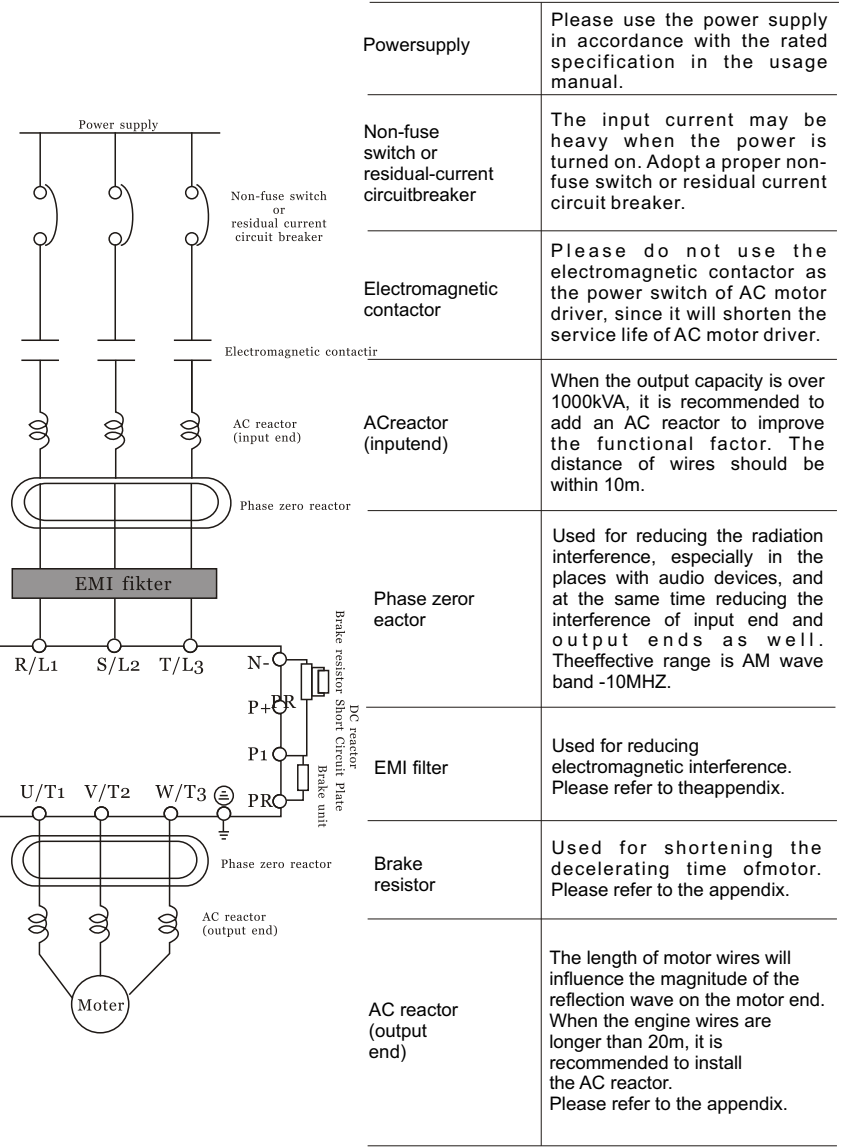


Basic Wiring Diagram 3

EC518D5G0022P43B~EC50560G0630P43B



2.4.2 System Wiring Diagram



The main wiring diagram of EACN AC DRIVE

Type	Input Voltage KW	Motor KW	Diameter of main wire mm ²	Diameter of control wire mm ²	Air breaker A
EC500D4G23	220V	0.4	2.5	1	16
EC50D75G23	220V	0.75	2.5	1	16
EC501D5G23	220V	1.5	4	1	32
EC502D2G23	220V	2.2	4	1	32
EC50D75G43	380V	0.75	2.5	1	16
EC501D5G43	380V	1.5	2.5	1	16
EC502D2G43	380V	2.2	2.5	1	16
EC503D7G43	380V	3.7	4	1	16
EC504D0G05D5P43	380V	5.5	4	1	32
EC505D5G07D5P43	380V	5.5	4	1	32
EC507D5G0011P43	380V	7.5	6	1	40
EC50011G0015P43	380V	11	6	1	63
EC50015G18D5P43	380V	15	10	1	63
EC518D5G0022P43	380V	18.5	10	1	100
EC50022G0030P43	380V	22	16	1	100
EC50030G0037P43	380V	30	25	1	125
EC50037G0045P43	380V	37	25	1	160
EC50045G0055P43	380V	45	35	1	200
EC50055G0075P43	380V	55	50	1	200
EC50075G0090P43	380V	75	70	1	250
EC50090G0110P43	380V	90	70	1	310
EC50110G0132P43	380V	110	95	1	400
EC50132G0160P43	380V	132	150	1	400
EC50160G0185P43	380V	160	185	1	630
EC50185G0220P43	380V	185	240	1	630
EC50220G0250P43	380V	220	150*2	1	800
EC50250G0280P43	380V	250	150*2	1	800
EC50280G0315P43	380V	280	150*2	1	800
EC50315G0350P43	380V	315	185*2	1	1000
EC50350G0400P43	380V	350	150*4	1	1000
EC50400G0450P43	380V	400	150*4	1	1200
EC50450G0500P43	380V	450	150*4	1	1200
EC50500G0560P43	380V	500	150*4	1	1200
EC50560G0630P43	380V	560	185*4	1	1500

2.4.3 Connection of the Main Loop Terminals

Description of the Main Loop Terminals

No. of Terminal	Description
R/L1 S/L2 T/L3	Input end of commercial power supply (single-phase/3-phase)
U/T1 V/T2 W/T3	AC Motor drivers output connected with 3-phase induction motor
⊕2 PR	≤15KW with brake component which is connected to terminal P1,PR.To improve the brake moment of force, an outside brake resistance is needed.
⊕2 ⊖	Machinery ≥18.5KW install drive circuit without outside braking resistance component. To improve braking power, outside braking resistance and braking component is necessary(both are optional)
⊕2 ⊕1	Connect DC reactor to improve power factor, reduce the DC bus AC pulse
EG	For safety and small noise' AC motor drivers ground terminal EG should be well grounded.

General matters of main loop wires that need

■ Please do not connect the AC with the output terminal (U/T1, V/T2 and W/T3) of AC drive; otherwise it may cause AC drive damage.

■ Ensure that the screws of the main loop terminals are tightened to prevent the sparks caused by the loose screw due to vibration.

■ The wires of main loop and those of control loop must be separated to avoid misoperation. If an intersection is needed, make them intersect with a right angle.

■ Please use isolated cable and conduit, and connect with the two ends of the shielding layer or conduit with ground.

■ If the installation place of the AC motor driver is extremely sensitive

to interference, please add an RFI filter in a place with a distance from the AC motor driver as close as possible. The lower the carrier frequency of PWM is, the less the interference there will be.

■ When the AC motor driver is equipped with a residual current circuit breaker for the protection against electric leakage, please select the ones with action current over 200mA and action time over 0.1s to avoid the misoperation of residual current circuit breaker.

■ The AC motor driver, motor and wires will cause noise interference. Pay attention to the surrounding sensors, and check whether there is misoperation of the equipment to prevent the accidents.

Description of the power supply input terminals of the main loop(R/L1 S/L2 T /L3)

■ Ascertain the voltage of power supply and the maximum current that can supply.

■ Main loop terminal R/L1, S/L2, T/L3 is connecting to a three-phase AC power through the circuit (wiring) protection with circuit breakers or earth leakage protection circuit breakers, without considering phase sequence connection

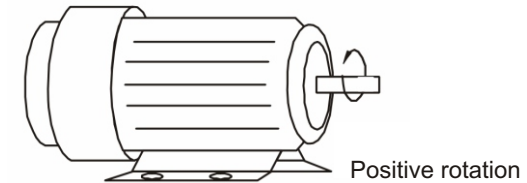
■ To cut off power and avoid accident when AC motor driver protection power is on, electromagnetic contactor to connecting to the circuit is necessary. (The two ends of the electromagnetic contactor should be equipped with R-C surge absorber).

■ Don't use main loop ON/OFF switch to start and stop AC motor driver. Use loop control terminal FWD, REV or RUN/STOP button on the control panel to start and stop AC motor driver. If you must use main power supply ON/OFF switch to start and stop, do it no more than 1 time within one hour.

■ Do not connect the 3-phase power supply machine with the single-phase power supply.

Output terminals of AC motor driver(U/T1. V/T2. W/T3)

■ Connect AC motor driver output terminal to 3 phase motor according to correct phase order. If motor rotates in wrong direction, change any 2 phase of U, V, W.

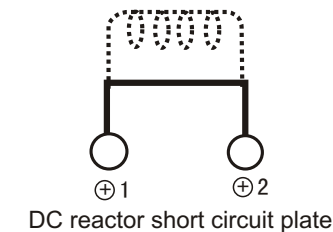


■ The output terminal of AC motor driver can't be connected to the inlet phase capacitor or surge absorber. If the wires are very long, it should be connected with the AC reactor on the output end.

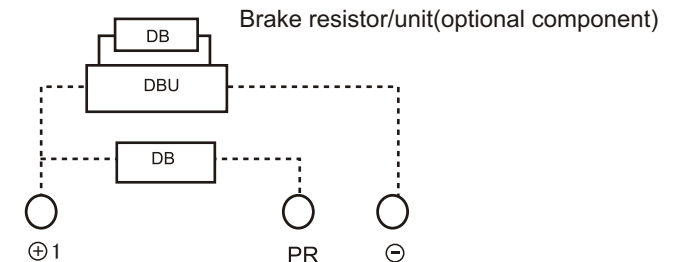
■ There is high frequency current in the extra long wire between motor and AC motor driver. This may cause AC motor driver over flow and stop. Besides, long wire increase leaking current, this leads to poor precision of current value. AC motor driver ≤ 3.7 KW choose wire less than 20 meters to motor, less than 50 meters for AC motor driver over 3.7 KW. If the wire is very long a wave filter connected to the output side AC reactor is necessary

■ Used insulation strengthened motor

Connection terminals of DC reactor [⊕1 , ⊕2]



The connection terminals of the external brake resistor [⊕1 , PR] and the connection terminals of the brake unit [⊕1 , ⊖]



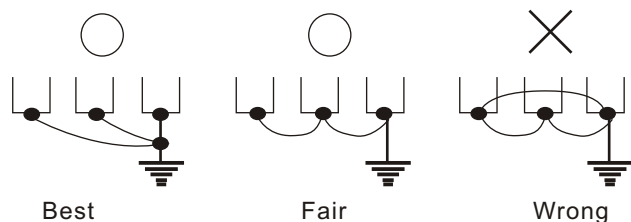
Grounding terminals of AC motor driver (EG)

■ For safety and noise reduction, the grounding terminals of AC motor driver should be well grounded.

■ The grounding wire of AC motor driver can't be grounded together with the machines with heavy current load e.g. the electric welding machine and high power motor, they should be grounded separately instead.

■ In order to prevent electric shock and fire, the external metal grounding wires of electric equipment should be wide and short, and connected to the special grounding terminals of the AC motor driver system.

■ If there is more than one AC motor speed controller connecting with the ground, Please make sure that is does not form grounding loop, shown as the following figures:

**2.4.4 Control Terminal connections**

Sort	symbol	Terminal name	Function
Simulate value input	FS	potentiometer power	potentiometer power (+12VDC) for setting frequency (1~5k Ω)
	FV	Voltage input setting	1. Frequency set by an external analog input voltage command Value ①0~10V DC/0~100%. ②antiaction:+10v~0V DC/0~100%. 2. Input PID target control signal, input impedance:20k Ω

Sort	symbol	Terminal name	Function
Simulate value input	FI	Current input	1. Frequency set by an external analog input current / voltage command value ①4~20mA DC/0~100%. (Set Sw1 is ON) ②0~10V DC/0~100%. (Set Sw1 is OFF) 2. Input PID feedback control signal, input impedance:250 Ω
	FC	Simulated public terminal	Public terminal of simulated input signal.
Joint input	S1	Positive rotation/stop	Terminal S1-SC: ON: Positive rotation run OFF:low down and stop
	S2	Multifunction input2	Terminal S2~S8 is functional for motor free rotation, outside alarm, alarm resume, multi-pace frequency signal. For more detail, please check terminal function Setting (S2~S8) (B01~B07)
	S3	Multifunction input3	
	S4	Multifunction input4	
	S5	Multifunction input5	
	S6	Multifunction input6	
	S7	Multifunction input7	
	S8	Multifunction input8	
	SP	+24V power	Max.output current :500mA
	SC	Public input terminal	Public terminal for signal input
Simulate value	FMA	Simulate monitor (FC public terminal)	Output monitor signal of simulated voltage 0~+10VDC Choose one of the following choices as the minitoring target: 1. output frequency(10V/max frequency A10) 2. output current flow(10V AC motor drivers rated current) 3. power output(10V AC motor driver rated current) 4. DC voltage10V/400V(200V grade)800V(400V grade)
Joint output	Y1/Y2 A/B/C	Optional signal output relay	AC motor drivers output minitor signal by transistor OC, signals are "RUNNING, FREQUENCY ARRIVAL, OVERLOAD FORCAST, ETC... There is 4 output singals altogether. Please check terminal function setting.
	Y3/Y4	Y3,Y4 Transistor OC output Y3、Y4	

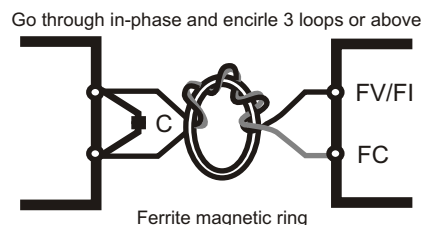
SORT	symbol	Terminal name	FUNCTION
communication	DA DB	RS485 communication input/output	RS485 communication input/output terminal connecting max.31 AC motor drivers
grounding	EG	Control wire grounding protection	Control wire grounding protection Control wire grounding protection

Analog input terminals (FS, FV, FI, FC)

■ The connection with analog signal is especially easy to be influenced by the interference of external noise, thus the wire should be as short as possible (less than 20m), and shielding wire should be used. The outer wire mesh of the shielding wire should be basically grounded, but if the inducing noise is very loud, it is better to connect it to the FC terminal.

■ For the need of using contact in this circuit, the double-fork contact which can process weak signals should be used. Besides, the terminal FC should not adopt contact control.

■ While connecting with the external analog signal follower, sometimes the interference caused by the analog signal follower or the AC motor driver will lead to misoperation, in such conditions, the capacitor and the magnetic core of ferrite may be connected to the external analog follower, as shown below:



Input terminals of contact (S1~S8)

■ While controlling the input of contacts, in order to prevent bad contact, the contacts that have high reliability for the contact with weak signals should be used.

Output terminals of transistor(Y3, Y4)

■ The polarity of the external power supply should be correctly connected.

■ While connecting the control relay, the surge absorber should be connected with the two ends of field coil. Please ensure that the polarity is correctly connected.

Others

■ It's best to use the shielding wires as control wires, the isolation network divested segment before the terminals should not be exposed.

■ The wires of control terminals should keep away from the wires of the main loop, or misoperation may be caused due to noise interference. If an intersection is needed, make them intersect with a right angle.

■ Generally the control wires don't have good insulation. If the insulation layer is broken due to some reason, high voltage may enter the control circuit (control panel), leading to circuit damage, equipment accidents or personal Danger .

■ The control wires in the AC motor driver should be fixed properly to prevent them from the direct contact with the charge-carrying part of the main circuit (e.g. the terminal strips of the main circuit).

3.1 Check and Test before Operation

The following matters should be paid attention before the operation:

■ Check if wire connection is correct. Confirm AC motor driver output terminal U, V, W is not connected to POWER and the ground terminal E(G) is grounded well.

■ Confirm there is no short circuit within every terminal and electrically naked part.

■ Confirm all terminals connection and joints are tight and not loose

■ Ensure that the motor isn't connected with loaded machine.

■ Before turning the power on, ensure that all the switches are in the disconnected state to guarantee that the AC motor driver won't start or operate abnormally when the power is on.

■ The power supply can only be turned on after the upper cover is installed.

■ It is forbidden to operate the switch with wet hand.

■ Display of the keypad panel (no indication of faults)

■ The cooling fan installed in the AC motor driver should work normally.

3.2 Running way

There are many running ways showed in “Chapter 4 CONTROL PANEL AND OPERATION” and Chapter5 “FUNCTION DATA ILLUSTRATION”. Choose the best operation way according to actual need and running regulations. The common running ways are listed on figure 7-1

running way	frequency setting	running order
key panel operation	Keyboard keys select  or panel adjustment potentiometer	Press  or  to start and  to stop
Remote Control	potentiometer or simulated voltage current	Input joint terminal S1-SC、terminal S2-SC

3.3 Test Run

If no abnormality is detected after the inspection and preparation before the operation according to 3-1, the test run can be performed. When the products leave the factory, they are set to work in the external terminal operation mode, which can be switched to manipulator operation mode via the key combination of  + .

1. After the power supply is on, confirm that the LED displays the frequency 0.00Hz.

2. Use the key to set low frequency around 5Hz

3. Press  or  to start and  to low down and stop

4. Check the following before running:

Check whether the rotation of motor is correct.

Check whether the rotation of motor is steady (without abnormal noise or vibration).

Check whether the acceleration / deceleration are steady.

If there is no abnormality, perform the test run with frequency increased. If no abnormality happens in the test run above, the formal operation can be started.

Notice!

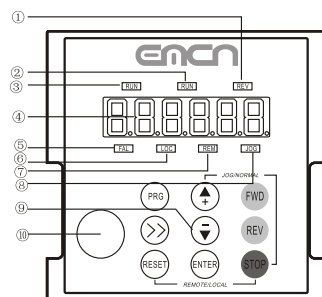
If there is any abnormal phenomena occurred, stop AC motor driver immediately. Consult “fault diagnosis” to find the problem. When AC motor driver stops, terminal L1/R1, L2/S, L3/T is still with power if main circuit is not switched off. Any touch onto terminal U, V, W will be shocked. Besides, wave filter capacitor is still full of charging voltage and need certain period of time to discharge, if main circuit power is off. Touch inner AC motor driver circuit only after power and the DC circuit voltage tested by DC circuit voltage meter is below safety voltage.

4.1 Appearance & Operation Procedure of LCD Keypad Panel

LED operation panel is composed of a 6-bit 8-segment nixietube and 7 LBDs, able to display the Chinese, English and Russian, as well as the operation status of AC motor driver, operation direction, alarm, pre-alarm information, panel/remote control directions, monitoring data, I/O status, function of parameters, and data settings.

The panel is detachable, and isolated from input encoder. During the operation, the panel is allowed to be removed, but when the operation is related to the panel, e.g. the run/stop and frequency setting are controlled by the panel, it is not recommended to do so.

4.1.1 Appearance of the Keypad Panel of Nixie Tube



1. REV This LED indicator light will be on when the motor is in positive rotation
2. FWD This LED indicator light will be on when the motor is in reverse rotation
3. RUN This LED indicator light will be on when the moto is running
4. 6-bit LED nixietubes display
5. FAL This LED indicator light will be on when the frequency converter has faults.
6. LOC This LED indicator light will be on when controlled by the Panel.
7. REM This LED indicator light will be on when controlled by the control mode set by A03
8. JOG This LED indicator light will be on when inching condition
9. Operation area of touch buttons
10. Knob of encoder

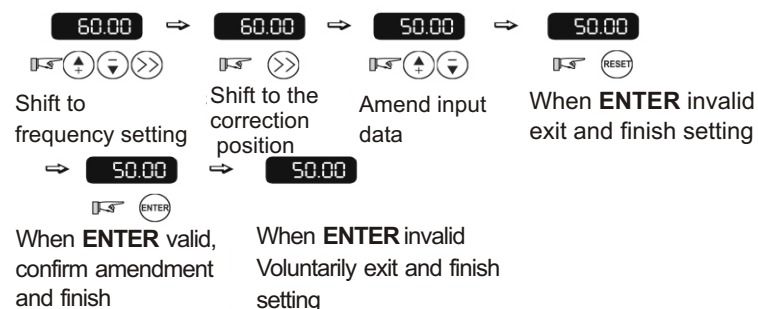
Functions of key combinations:

(STOP)+(RESET): Pressing **(STOP)** and **(RESET)** simultaneously can switch the status between LOCAL and REMOTE.

(STOP)+(↑): When the panel status is LOC, pressing **(STOP)** and **(↑)** simultaneously can enter or exit INCHING status.

4.1.2 Operation Procedure of LCD Keypad Panel

Use **(↑)** **(↓)** to set frequency on the initial interface.



When control function is valid on the control panel, **START**、**FWD**、**STOP**

Notice! and when shift to frequency setting.

Use panel potentiometer to set frequency on the initial interface:

Under the initial interface, using potentiometer can change the frequency setting, turning it left will reduce the setting and turning it right will increase the setting. When gently pressing the potentiometer, the operation position can be chosen for alteration in order to acquire the frequency needed for quick alteration.

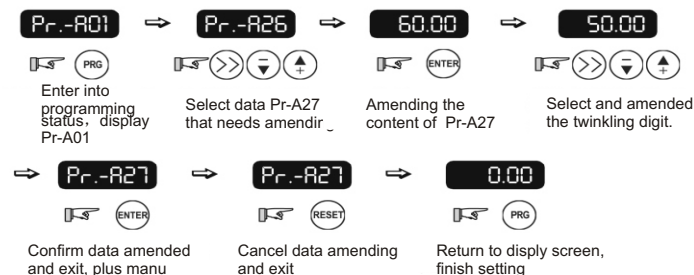
SHIFT OF MONITORING TARGET:

Press ENTER to shift to monitoring target. It displays the monitoring data first, then shift to display data 1 second later.

NO.	LED display	Item illustration
0	F-OUT→50.00	Actual frequency output value
1	F-SET→50.00	Actual frequency setting value
2	V-OUT→380.0	Actual voltage output value
3	A-OUT→11.0	Actual current output value
4	KVA→7	Actual power output value
5	EDC→540	DC current voltage inside AC motor driver
6	PID→0.000	The current value of the closed-loop feedback
7	TEP→37	AC motor driver radiator temperature
8	S1-8→111	S1-S8 outside terminal input, 1 valid, dark invalid
9	Y1-Y4→11	Y1-Y4 outside terminal output, 1 valid, dark invalid
10	HOU→103	AC motor driver total running or in power time(select by Pr-C31)
11	VER→2.00	Control panel edition

POWER DATA SETTING:

(EXAMPLE: change first frequency to: 50.00Hz)

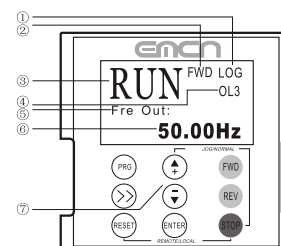
**Reference Table of Code**

A	B	C	D	E	F	G	H	O	S	N	L	T	P	R	U
R	b	c	d	e	f	g	h	o	s	n	l	t	p	r	u

4.2 Appearance & Operation Procedure of LCD Keypad Panel

LCD operation panel is a 128*64 lattice black and white LCD screen, able to display the Chinese, English and Russian, as well as the operation status of AC motor driver, operation direction, alarm, pre-alarm information, panel/remote control directions, monitoring data, I/O status, function of parameters, and data settings.

The panel is detachable, and isolated from input encoder. During the operation, the panel is allowed to be removed, but when the operation is related to the panel, e.g. the run/stop and frequency setting are controlled by the panel, it is not recommended to do so.

4.2.1 LCD Keyboard Panel Appearance

1. LOC, EMx display the effective control source.
2. WD, REV display the rotation direction during the operation
3. RUN, STOP indicate the operation of AC motor driver
4. Show the fault/ alarm code, inching status
5. Show the monitored parameters
6. Show the specific values of monitored parameters
7. Operation area of touch buttons

Functions of key combinations:

(STOP) + (RESET) : Pressing (STOP) and (RESET) simultaneously can switch the status between LOCAL and REMOTE.

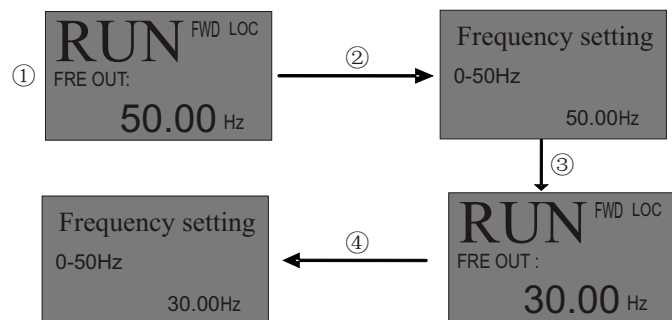
(STOP) + (↑) : When the panel status is LOC, pressing (STOP) and (↑) simultaneously can enter or exit INCHING status.

4.2.2 Operation Procedure of LCD Keypad Panel

The data on the panel are arranged in the menu and sub-menu, and the general operation can be conducted in the following way.

Setting of main frequency of panel

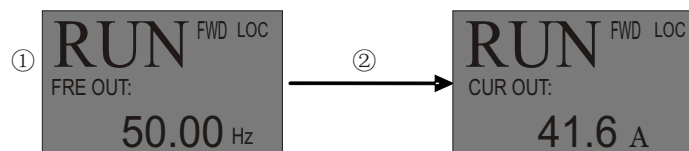
(e.g. the main frequency is altered to: 30.00Hz)



Under the initial interface ①, press to $\uparrow$ $\downarrow$ $\gg$ enter the frequency setting interface ②; under the frequency setting interface $\gg$, press to choose the position that needs to be altered, then press $\uparrow$ $\downarrow$ to alter the frequency from 5 to 3, as ③ shown; after finishing the frequency setting, press ENTER to end, as ④ shown.

Switch of the monitored parameters

(e.g. the monitored parameter is altered to: output current)



Under the initial interface ①, press ENTER to switch the monitoring content, as ② shown.

CODE	LCD display	MEANING
0	Fre Out	Frequency output value
1	Cur Out	Current output value
2	Vol Out	Voltage output value
3	Pow Out	Power output value
4	EDC	DC circuit voltage
5	PID	feedback value
6	Fre Set	frequency settled

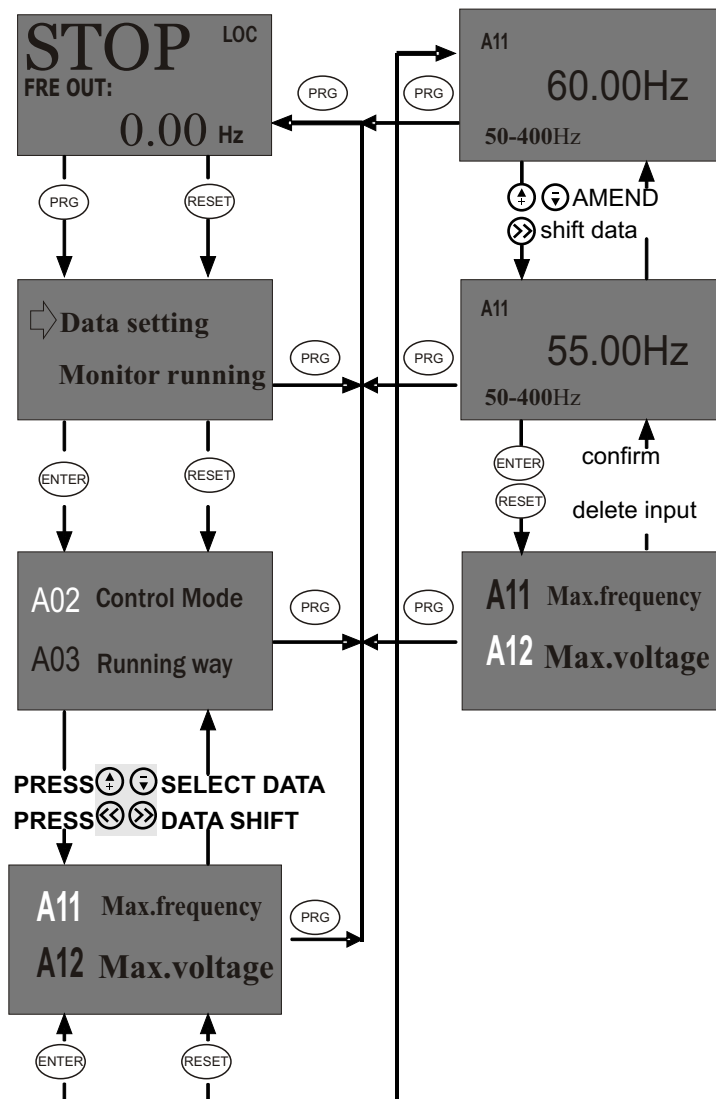
Operations like parameter setting/ operation data/ maintenance information/ fault information / data copy

Under the initial interface, press PRG to enter the operation interface, press $\uparrow$ $\downarrow$ to choose the functional option, press ENTER to enter the functional menu, press RESET to return to the initial interface, press $\uparrow$ $\downarrow$ to switch the pages, and press RESET to exit.

CONTENT	LCD DISPLAY		FUNCTION
1.data setting	During installation,set AC motor driver data to be proper value.There is 6 relative group data in data setting manu.		
2.monitor running	First screen	Fout = x x x . x x Hz I out = x x . x A Vout = x x x V	Frequency output value
			Current output value
			Voltage output value
	Second screen	S 1 = 1 X 4 = 0 S 2 = 0 X 5 = 0 S 3 = 1 X 6 = 0	Status of input terminal S1~S8 and Y1~Y4 output terminal (connect input terminal and CM terminal to be 1 is valid , 0 is invalid.)
	Third screen	S 7 = 0 Y2 = 0 S 8 = 0 Y3 = 0 Y1 = 0 Y4 = 0	
3. Maintenance information	First screen	EDC= x x Xv TMPF=xx °C TIME= x x x x x h	Middle DC voltage
			AC motor driver inner temperature
	second screen	KVA =400V /18A MINV = V e r x . x KINV = V e r x . x	AC motor driver total running time
4 alarm information	only one screen	-1= -4= -2= -3=	AC motor driver power grade
			Main board ROM edition
			Panel ROM edition
5 data copy	only one screen	<DATA COPY> STV2.1 READ 	Data copy and checking for batch AC motor driver data setting
6.Specialized function	Users can not modify these parameters or view.Only in the maintenance of the course or need to replace the control panel,by the manufacturer to modify professionals		

FUNCTION DATA SETTING

(e.g. the max frequency is altered to: 30.00Hz)



5.1 Function parameter list

NO.	Function name	Description	Factory Default	Page NO.
A01	Data select	0:changeable data 1:fixed data 2-6:reserve 7:initialization setting	0	56
A02	control mode	0: V/F control 1.current vector control	1	56
A03	Operation mode selection (Oper Mode Select)	Setting operation frequency setting 0: Operator Operator 1: Terminal Operator 2: Operator Analog terminal 3: Terminal Analog terminal 4: Operator Communication 5: Terminal Communication 6:Communication Communication 7:Communication Operator 8:Communication Terminal	3	56
A04	Display mode (Display Units)	0:0.01Hz unit 1:0.1% unit 2~39: 120 x Fre Order(Hz)/A04(The setting pole of motor)=r/min 40~3999:The scaling position is the forth position 3-1 to 100% frequency value.The 3~1 places decide the setting value of 100% Fre.	0	57
A05	Stopping method (Stopping Method)	0:ramp to stop with first ramp time (factory default) 1:coast to stop 2:coast to stop with first ramp time 3:coast to stop with second ramp time	0	57
A06	Motor rotation (Motor Rotation)	0:CCW shaft rotation 1:CW shaft rotation	0	59
A07	Prohibit reverse operation (Reverse Oper)	0:Reverse operation enabled 1:Reverse operation disabled	0	59
A08	Input voltage (Input Voltage)	Setting AC motor driver input voltage.	200.0V*1	59

NO.	Function name	Description	Factory Default	Page NO.
A09	V/f pattern selection (V/f Selection)	Lower limit of A35 frequency output Upper limit of A36 frequency output A10 Maximum voltage A15 Intermediate voltage A17 Starting voltage A16 Minimum starting frequency A14 Intermediate frequency A13 Maximum voltage frequency A11 Maximum operation frequency Range of frequency output	15	59
A10	Rated voltage		200.0V*1	61
A11	Maximum frequency (Max Frequency)		50.00Hz	61
A12	Maximum voltage (Max Voltage)		200.0V*1	61
A13	Base frequency (Base Frequency)		50.00Hz	61
A14	Mid. Output frequency (Mid Frequency)		3.00Hz	61
A15	Mid. frequency voltage (Mid Voltage)		12.0V*1	61
A16	Minimum output frequency (Min Frequency)		1.50Hz	61
A17	Minimum output voltage (Min Voltage)		6.0V	61
A18	Acceleration time 1 (Accel Time 1)	Unit:0.1s (1s for 1000s and above) Setting range:0.	10.0S	62
A19	Deceleration time 1 (Decel Time 1)	Unit:0.1s (1s for 1000s and above) Setting range:0~3600s	10.0S	62
A20	Acceleration time2 (Accel Time 2)	Multi-functional contact input selection or choose to accel time 2 in a stop method choice, or internal control section's speed more effective,same as A18 set. Setting range:0~3600s	10.0S	62
A21	Deceleration time2 (Decel Time 2)	Multi-functional contact input selection or choose to decal time 2 in a stop method choice, or internal control section's speed more effective,same as A19 set. Setting range:0~3600s	10.0S	62

NO.	Function name	Description	Factory Default	Page NO.
A22	Acceleration time 3 (Accel Time 3)	Multi-functional contact input selection or internal control section's speed more effective.Same as A18 set. Setting range:0~3600s	10.0S	62
A23	Deceleration time 3 (Decel Time 3)	Multi-functional contact input selection or internal control section's speed more effective.Same as A19 set. Setting range:0~3600s	10.0S	62
A24	Acceleration time 4 (Accel Time 4)	Multi-functional contact input selection or internal control section's speed more effective.Same as A18 set. Setting range:0~3600s	10.0S	62
A25	Deceleration time 3 (Decel Time 3)	Multi-functional contact input selection or internal control section's speed more effective.Same as A19 set. Setting range:0~3600s	10.0S	62
A26	S-curve selection (S-Curve Select)	0: No S_curve 1: 0.2 Sec. 2: 0.5 Sec. 3: 1.0 Sec.	1	62
A27	Frequency 1 (Frequency 1)	The order for Main Frequency setting Setting range:0.0~400Hz0.00HZ	0.00HZ	63
A28	Frequency 2 (Frequency 2)	External control instruction 2 or multi-speed control step 2 more frequency of effective frequency 2 instructions. Setting range:0.0~400Hz	0.00HZ	63
A29	Frequency 3 (Frequency 3)	External control instruction 3 or multi-speed control step 3more frequency of effective frequency 3 instructions. Setting range:0.0~400Hz	0.00HZ	63
A30	Frequency 4 (Frequency 4)	External control instruction 4 or multi-speed control step 4 more frequency of effective frequency 4 instructions. Setting range:0.0~400Hz	0.00HZ	63
A31	Frequency 5 (Frequency 5)	External control instruction 5 or multi-speed control step 5 more frequency of effective frequency 5 instructions. Setting range:0.0~400Hz	0.00HZ	63

NO.	Function name	Description	Factory Default	Page NO.
A32	Frequency 6 (Frequency 6)	External control instruction 6 or multi-speed control step 6 more frequency of effective frequency 6 instructions. Setting range:0.0~400Hz	0.00HZ	63
A33	Frequency 7 (Frequency 7)	External control instruction 7 or multi-speed control step 7 more frequency of effective frequency 7 instructions. Setting range:0.0~400Hz	0.00HZ	63
A34	JOG frequency (Jog frequency)	External Jog frequency control,or the keyboard Jog frequency,or the effective Fre order is the Fre of the external multi-speed control step 8. Setting range:0.0~400Hz	0.00HZ	63
A35	Frequency upper limit (Freq Upper Limit)	Unit:1% Setting range:0%~100%	100%	63
A36	Frequency lower limit (Freq Lower Limit)	Unit:1% Setting range:0%~100%	0%	63
A37	Jump frequency 1 (Jump Freq 1)	Jumping frequency point of instruction. When set this value to be 0.00HZ, this function is not working. Setting range:0.0Hz~400.00Hz.	0.00HZ	64
A38	Jump frequency 2 (Jump Freq 2)		0.00HZ	64
A39	Jump frequency bandwidth (Jump Bandwidth)	The Fre range of the jump frequency. When set this value to be 0.00HZ, this function is not working. Setting range:0.0Hz~25.00Hz.	1.00HZ	64
A40	Running mode	0:run according to common control way 1:inner control multi-speed, this mode stops after running for one week AC motor driver runs with the inner data step by step when run order is given. It stop running automatically one week later. AC motor driver restart when running order is given again. 2:Inner control multi-speed: when repeated running order is given, AC motor driver repeat running step by step according to the inner data.	0	65

NO.	Function name	Description	Factory Default	Page NO.
A40	Running mode	Orders are not accepted except order of STOP, External Error Instant STOP when AC motor driver is running. 3:Inner control multi-speed: after running order is given, AC motor driver runs the inner data step by step. It runs with the last speed after one week.	0	65
A41	Step 1	Example: F 2 100 100:pace running time:100S 2:pace accelerate/retard time 2 F:pace motor running direction: F is CCW, R is CW	F1,0S	65
A42	Step 2		F1,0S	65
A43	Step 3		F1,0S	65
A44	Step 4		F1,0S	65
A45	Step 5		F1,0S	65
A46	Step 6		F1,0S	65
A47	Step 7		F1,0S	65
B01	Multi-function input selection 1 (Terminal S2 Sel)	0:Reverse run (2-wire sequence) 1:Fwd / Rev command (3-wire sequence) 2:External fault (normally open) 3:External fault (normally closed) 4:Fault reset	0	66
B02	Multi-function input selection 2 (Terminal S3 Sel)	5:Local/remote selection 6:Transmit/control circuit terminal selection 7:Abnormal stop	2	66
B03	Multi-function input selection 3 (Terminal S4 Sel)	8:Main Frequency order input selection 9:Multi-speed order 1/SS1 10:Multi-speed order 2/SS2 11:Multi-speed order 4/SS4 12:Jog reference 13:Accelerate/retard time selection 1/RT1	4	66
B04	Multi-function input selection 4 (Terminal S5 Sel)	14:Accelerate/retard time selection 2/RT2 15:External BB(ON joint input) 16:External BB(OFF joint input) 17:Speed Search from max.frequency 18:Speed Search from set frequency	9	66
B05	Multi-function input selection 5 (Terminal S6 Sel)	19:Parameter setting enable / disable 20:PID integral value reset 21:PID control disable 22:Timer function	10	66

NO.	Function name	Description	Factory Default	Page NO.
B06	Multi-function input selection 6 (Terminal S7 Sel)	23:External overheat alarm (OH3) 24:Analog reference sample hold command 25:Inertia ridethrough command (normally open) 26:Inertia ridethrough command (normally closed) 27:UP/DOWN order 28:JOG inversion Setting range: B01:0~26 B02~B06:2~26 B07:2~28	11	66
B07	Multi-function input selection 7 (Terminal S8 Sel)		12	66
B08	Multi-function output selection 1 (Terminal Y1 Sel)	0:Fault 1:During running 2:Frequency agree 3:Desired frequency agree 4:Frequency detection 1(Output Fre≤Any Fre) 5:Frequency detection 2(Output Fre≥Any Fre) 6:Over/Undertorque detection (normally open) 7:Over/Undertorque detection (normallyclosed) 8:BB(base level blockade) 9:Running mode 10:AC motor driver run ready 11:Timer function 12:Automatic restart 13:OLoverloadalarm 14:Frequency reference loss 15:Transmission data output 1 16:Transmission data output 2 17:PID feed back lost 18:OH1 alarm 19:Running at Zero_speed 20:Output frequency reach the lower limit Freq 21:Output frequency reach the upper limit Freq 22:Auxiliary pump 1 23:Auxiliary pump 2	0	73

NO.	Function name	Description	Factory Default	Page NO.
B09	Multi-function output selection 2 (Terminal Y2 Sel)	Set items are as same as B01	1	73
B10	Multi-function output selection 3 (Terminal Y3 Sel)	Set items are as same as B01	2	73
B11	Multi-function output selection 4 (Terminal Y4 Sel)	Set items are as same as B01	3	73
B12	ON delay timer (On-Delay Timer)	The delay time of the connect from the input to the output Setting range:0.00s~25.5s	0.0S	75
B13	OFF delay timer (Off-Delay Timer)	The delay time of the disconnect from the input to the output Setting range:0.00s~25.5s	0.0S	75
B14	Master analog input selection -FV or FI terminal (Analog Input Sel)	0:The main Fre order is the analog terminal FV,0~10V 1: The main Fre order is the analog terminal FI,4~20mA	0	75
B15	Aux. Analog input selection (Terminal FI Sel)	0: 0~10V input 1: 4~20mA input(SW1-1 is on)	1	75
B16	Frequency retention (Freq Memory)	0: Retained in frequency reference A27 1: Not retained after power-down	0	75
B17	Operation method for frequency reference loss detection (Ref Loss Detect)	0: No detection 1: Continue to run	0	76
B18	Terminal FV gain (Terminal FV Gain)	Unit:1% Setting range:0~200%	100%	76
B19	Terminal FV bias (Terminal FV Bias)	Unit:1% Setting range:-100%~100%	0%	76
B20	Multi-function analog output FMA (Terminal FMA Sel)	0: Output Frequency(10V is the max. Frequency) 1: Output current(10V is the AC motor driver rated current) 2: Output power(10V is the AC motor driver rated power) 3: DC bus voltage(10V/400V200V grade, 10V/800V400V grade)	0	77

NO.	Function name	Description	Factory Default	Page NO.
B21	Analog monitor gain (Terminal FMA Gain)	Adjust the analog monitor output gain Setting range:0.01~2.00	1.00	77
B22	Frequency agree set point (Freq Det Level)	"frequency test" is functioning when output frequency is over or lower than frequency test standard B22. Setting range:0.00 ~ 400.00Hz	0.00HZ	78
B23	Frequency agree detection width (Freq Det Width)	frequency test release width Setting range:0.00~25.00Hz	0.00HZ	78
B24	CT / VT selection(CT / VT Selection)	0: constant torque of G ,the coefficient of over load is 150%1min 1: fan-type pumps of P , the coefficient of over load is 120%1min	*3	79
C01	Carrier frequency (Carrier Freq Sel)	The setting value 1,2,4-6: The carrier frequency=The setting value x 2.5KHz The setting value 3:The carrier frequency=8.0KHz The setting value 7,8,9:When it is 1~2.5KHz,,the change of the carrier frequency is according to the output frequency.	*3	79
C02	Momentary power loss ridthrough method (Pwr Loss Sel)	0:Not provided 1:Continuous operation after power recovery within 2s 2:Continuous operation after power recovery within control logic time (no fault output)	0	80
C03	Speed search level -decel time fixed at 2 sec (SpdSrch Current)	Unit: 1% Setting range: 0~200% 100%=inverter rated current	110%	81
C04	Minimum baseblock time (Min Baseblock t)	During speed searchin,set in dealing instant power off, the minimal time unit :0.1 s Setting range:0.5~5.0s	*3	81
C05	V/f reduction level during speed search (SpdSrch V/f)	Set the decreasing standard of speed searching time V/F.During speed searching V/F= (V/F during common running) x(C05). Seeting range:0~100%	*3	81

NO.	Function name	Description	Factory Default	Page NO.
C06	Power loss ride through time (PwrL Ridethru t)	Set compensation instant power off. Setting range:0.0~2.0s	*3	81
C07	Automatic retry attempts (Num of Restarts)	"Set AC motor driver self diagnose and restart times when error occurs. (OC OU Uu1 GF) Setting range:0~10	0	82
C08	Fault contact selection during automatic retry (Restart Sel)	0:Closed during fault retry 1:Open during fault retry	0	82
C09	DC injection current (DCInj Current)	100%=inverter rated current Setting range:0~100%	50%	82
C10	DC injection time at stop (DCInj Time @ Stop)	Set the DC braking time when AC motor driver stops. If set to be 0.0S, DC braking time is invalid. Setting range:0.0~10.0s	0.5S	82
C11	DC injection time at start(DCInj Time @ Start)	Set the DC braking time when ac motor drive starts. If set to be "0.0S", DC braking is invalid. Setting range:0.0~10.0s	0.0 S	83
C12	Torque compensation gain (Torq Comp Gain)	Setting range:0.0~3.0s (normally,no adjustment is necessary)	1.0	83
C13	Motor phase resistance(Motor ph resistance)	The moment of force data in AC motor driver is pre-set already and don't need to change. C13 setting range:0.0~65.53R C14 setting range:0~9999W	*3	84
C14	Motor iron loss (Motor iron loss)		*3	84
C15	Slip compensation gain (Slip Comp Gain)	Rotation difference compensation is increasing AC motor driver output frequency by propotion of motor loading capacity moment of force to decrease motor speed difference. Setting range:0.0~9.9%	0.0%	84
C16	Motor no-load current (No-Load Amp)	Set motor current with empty load, motor rated current is 100%. Setting range:0~99%	30%	84

NO.	Function name	Description	Factory Default	Page NO.
C17	Slip compensation primary delay time constant (Slip Comp Delay)	Set compensating delay data in wave filtering. Setting range:0.0~25.5s	2.0S	84
C18	Motor rated current (Motor Rated AMP)	Set rated current value for motor data plate, take the electronic overheat protector as motor protecting standard current. Setting range:10~200.0% In	*3	84
C19	Motor thermal protection (Motor OL Sel)	0: Protection disabled 1: General purpose motor (time constant 8 min.) 2: General purpose motor (time constant 5 min.) 3: Blower-cooled motor (time constant 8 min.) 4: Blower-cooled motor (time constant 5 min.)	1	84
C20	Stall prevention during deceleration (StallP Decel Sel)	0: without speed loss protection function during retard 1: with speed loss protection function during retard	1	85
C21	Current limit/Stall prevention level during acceleration (StallP Accel Lvl)	Unit:1% AC motor driver rated current 100%. Setting range:30%~200%	*3	85
C22	Current limit/Stall prevention	Level during running(StallP Run Level) Unit:1% AC motor driver rated current 100%. Setting range:30%~200%	*3	85
C23	Over torque detection OI3 (Torq Det Sel)	0: Detection disabled 1: Over torque detection at speed agree; continue running after detection(Alarm) 2: Over torque detection at run; continue running after detection(Alarm) 3: Over torque detection at speed agree; coast to stop after detection.(Fault) 4: Over torque detection at run; coasts to stop after detection.(Fault)	0	86
C24	Over torque detection level OI3 (Torq Det Level)	Setting range:30~200% 100%=inverter rated current	160%	86

NO.	Function name	Description	Factory Default	Page NO.
C25	Over torque detection delay time OI3 (Torq Det Time)	If the time of motor current surpassing torque moment of force testing standard(C24) is longer than testing time(C25), over torque moment of force testing function works Setting range:0.1s~10.0s.	0.1S	86
C26	Input phase loss detection level SPI (SPI Loss Lvl)	Unit:1% Setting range:1~100%. When setting is 100%, this function is disabled. DC400V (200V grade) and DC800V (400V grade) to be 100%.	20%	86
C27	Input phase loss detection Delay time(SPI delay)	Set the input phase missing test time Test time=1.28sec×(C27's value)	8S	86
C28	Output phase loss detection level SPO (SPO Loss Lvl)	Unit:1% AC motor driver rated current to be 100%. Setting range:0~100%	0%	86
C29	Output phase loss detection Delay time(SPO delay)	Set output phase missing test time. Setting range:0.0s~2.0s	0.2S	87
C30	AC Driver kVA (AC Driver kVA)	Read only, display the AC motor driver power grade	*3	87
C31	Elapsed timer selection (Elapsed Timer)	0: total time of accumulative when ac motor drive is power on 1: total time of accumulative when ac motor drive is running	1	87
C32	Elapsed timer L (Elapsed Time L)	When C32 is selected to be action total time, set C32 to be time with unit of 1 hour and calculate time from then on. C32 setting range:0~9999H C33 setting range:0~27*10000H	0H	87
C33	Elapsed timer H (Elapsed Time H)		0H	87
D01	PID selection (PID Mode)	0: PID disabled 1: PID enabled 2: PID w/Feed forward 3: PID w/Inverted feedback	0	87
D02	Feedback calibration gain PID (PID Fdbk Gain)	0: total time of accumulative when ac motor drive is power on 1: total time of accumulative when ac motor drive is running	1.00	88

NO.	Function name	Description	Factory Default	Page NO.
D03	Proportional gain PID(PID P Gain)	Set P control proportion increase. If set to be 0.0, no P control. Setting range:0.0~10.0	1.0	88
D04	Integral time PID (PID I Time)	Set I control proportion increase. If set to be 0.00, no I control. Setting range:0.0~100.0s	10.0S	88
D05	Derivative time PID (PID D Time)	Set D control proportion increase. If set to be 0.0, no D control. Setting range:0.00~1.00s	0.00S	88
D06	Feedback bias value (Fdbk bias LVI)	Deviation adjustment to frequency order control by PID. Unit:1%Setting range:-109%~109%	0%	88
D07	Limit of integral value PID (PID I Limit)	Set the up limits value of frequency output controlled by I. Unit:1% Setting range:0%~109%	100%	88
D08	Feedback filter time (Fdbk filter time)	Set the one time delay data of frequency order controlled by PID. Setting range:0.0s~2.5s	0.0S	88
D09	Feedback loss detection PID(PID FdbkLoss Sel)	0:Detection is disabled 1:Detection is enabled	0	89
D10	Feedback loss detection level PID(PID FdbkLoss Lvl)	Feedback lost test standard (PID), set losing grade of PID feedback with unit of 1%. Setting range:0%~100%.	0%	89
D11	Feedback loss detection delay time PID(PID FdbkLoss Time)	Delayed feedback lost time (PID), set testing PID feedback lost time. Setting range:0.0s~25.5s	1.0S	89
D12	Pump Control	0~2: The number of opening pumps in the constant pressure water supply control 3: close the pump control The factory default is 3,so if useconstant pressure water supply, please set D12 to be 0~2.	3	89
D13	Rotation time	When the two auxiliary pumps only one work,in order to average the time of working for every pump,the working time for one pump is D13 and then change to work for another one. Setting range:0~10000min	60min	89

NO.	Function name	Description	Factory Default	Page NO.
D14	Interlock time	When the two auxiliary pumps only one work,in order to average the time of working for every pump,the working time for one pump is D13 and then change to work for another one. This time is the middle waiting time. Setting range:0~250s	5S	89
D15	High-speed working	When the water consumption is increasing ,the ac motor drive is working on the max frequency,when it reach the setting time D15, the corresponding multi-functional contact action. Setting range:0~250s.	60S	89
D16	Low-speed working	When the water consumption is reducing,the ac motor drive is working on the min frequency,when it reach the setting time D16, the corresponding multi-functional contact action. Setting range:0~250s.	60S	90
D17	Stopping standard	When the water consumption is reducing,all of the auxiliary pumps have turned off,the main pump are working on the min frequency,when meet the following conditions: 1:(setting frequency/max frequency)* D17<PID feedback value	95%	90
D18	Stopping time	2:The time exceed D18 The ac motor drive stops output, and be in sleep mode. D17 Setting range:0~150% D18 Setting range:0~250s	30S	90
D19	Wake-up standard	The ac motor drive is in sleep mode. When the water consumption is increasing, the pressure of the pump will reduce accordingly. When meet the following conditions: 1: (setting frequency/max frequency) *D19>PID feedback value	80%	90
D20	Wake-up time	2: The time exceed D20 The ac motor drive begins outputting, the pump starts working. D19 Setting range:0~150% D20 Setting range:0~250s	30S	90

NO.	Function name	Description	Factory Default	Page NO.
E01	Energy saving selection (Energy Save Sel)	0:energy saving is disabled 1:energy saving is enabled	0	90
E02	Energy saving gain K2(Energy Save Gain)	Set the motor coefficient in max frequency , the factory settings are set according to the motor standard. Setting range:0.0~655.0	*3	90
E03	Energy saving voltage lower limit at 60Hz (EngSavVL Lmt@60Hz)	In a 60Hz energy saving operation mode set to count the lower limit value of the output voltage instruction value, the rated voltage is 100%. Setting range:0~120%	25%	90
E04	Energy saving voltage lower limit at 6Hz (EngSavVL Lmt@6Hz)	In a 6Hz energy saving operation mode set to count the lower limit value of the output voltage instruction value, the rated voltage is 100%. Setting range:0~25%	12%	90
E05	Time of average kW -Energy saving(EngSav Time/AvgkW)	Set average power computation time in energy saving mode. Setting range:1~200.	1	91
E06	Limit voltage	To control voltage through best running. The rated voltage of the motor is 100%. It can not running well if set percentage to be 0. Setting range:0~100%	0%	91
E07	100% anti-jump	Best start running voltage variation amplitude of voltage is set at 100%, with unit of 0.1% ,the motor rated voltage is 100%. Setting range:0.1%~10.0%	0.5%	91
E08	5% anti-jump	Best start running voltage variation amplitude of voltage is set at 5%, with unit of 0.1% ,the motor rated voltage is 100%.Setting range:0.1%~10.0%	0.2%	91
F01	MODBUS slave address (MODBUS Address)	0:AC motor driver break away from RS485 general control address, non controlled address. 1~31: controlled address of AC motor driver RS485 communication.	0	92
F02	MODBUS BPS selection (MODBUS Baud Rate)	0: 1200BPS 1:2400BPS 2:4800BPS 3:9600BPS 4: 19200BPS 5: 38400BPS	0	92

NO.	Function name	Description	Factory Default	Page NO.
F03	MODBUS parity selection (MODBUS Parity)	0:7N2 For ASCII 1:7E1 For ASCII 2:7O1 For ASCII 3:8N2 For RTU 4:8E1 For RTU 5:8O1 For RTU	3	92
F04	MODBUS time over detection (MODBUS Timeout)	0:Time over detection is disabled 1:Time over detection is enabled	1	93
F05	MODBUS stop method at communication error CE (MODBUS Fault Stop)	0:Ramp to stop-Decel 1(fault) 1:Coast to stop(fault) 2:Ramp to stop-Decel 2 (fault) 3:Continue operation(alarm)	1	94
F06	Stop method selection -OH1- for inverter overheat pre-alarm (OH1 Stop Method)	0:Ramp to stop-Decel 1(fault) 1:Coast to stop(fault) 2:Ramp to stop-Decel 2 (fault) 3:Continue operation(alarm) at 80% of frequency reference.	3	94
F07	DBR overheat	0: without braking resistance overheat protection 1:with braking resistance overheat protection	0	94
F08	Local/remote key function (Local/Remote Key)	0:LOCAL/REMOTE key function: invalid 1:LOCAL/REMOTE key function: valid	1	94
F09	Local / Remote changeover function selection (LOC/REM Change)	0:When LOCAL/ REMOTE shifting, re-run is valid when stop order is inputed 1:When LOCAL/ REMOTE shifting, re-run is valid at once	0	94
F10	Stop key function (Oper STOP Key)	0:STOP key is disabled when operated from terminals 1:STOP key is always enabled in any operating mode	1	94
F11	Frequency setting method from Enter key (Oper Enter Key)	0:"ENTER" key not used when set frequency order with operator 1:" ENTER" key used when set frequency order with operator	0	94

NO.	Function name	Description	Factory Default	Page NO.
F12	Monitor Variable unit selection (Variable unit sel)	0: m/s 1:Mpa/mm ² 2:Kg/ mm ²	1	94
Pr-F12	Fre set select	0:Frequency set by key button number 1:Frequency set by key potentiometer adjustment	1	94
F13	Operation panel LCD brightness (LCD brightness)	Used to adjust the brightness of LCD display. Setting range:0~10	1	94
Pr-F13	Data rewrite	0: Data copy 1: Data check 2: Data write	0	94
F14	monitoring parameter selection (Monitor sel)	0: setting frequency 1: output frequency 2: output current 3: output voltage 4: output power 5: voltage EDC 6: feedback PID	0	94
Pr-F14	Monitoring select	0: setting frequency 1: output frequency 2: output voltage 3: output current 4: output power 5: voltage EDC 6: feedback PID 7: temperature 8: S terminals functional 9: Y terminals functional 10: running time 11: version ROM	0	94
F15	Operation panel language selection (language sel)	0:Display Chinese 1:Display English	0	95
Pr-F15	LED Display sel	Only LED manipulator has this functional code 0: seven items for monitoring:(Fset, Fout, Vout, Aout, KVA, EDC, PID) 1:increase two external terminals S1-8 and Y1-4 for monitoring the input and the output. 2:increase three items for monitoring: TEP, HOU, the VER of mother board 3:increase five items which monitored above 1&2	0	95

NO.	Function name	Description	Factory Default	Page NO.
F16	Low_speed sel	0:Free running; 1:Running at A16(start freq) ; 2:Running at Zero_speed .	0	95
F17	Zero_speed increase	According to the rating current of 100% set the output current at zero speed. Setting range:0~100%	50%	95
F18	Motor tuning	0:no auto tuning; 1:static auto tuning(Suitable for use in already connected load motor) 2:Dynamic auto tuning(Suitable not connected to the load of the motor)	0	96
F19	Electrical leakage	With motor set by 100% of the rated voltage for motor voltage which is caused by the leakage inductance of the amount of pressure drop. Setting range:0~40%	18%	96
F20	AVR	0:No AVR 1:AVR	1	96
F21	Brak frequency	0.00Hz The function is invalid 0.1~50Hz When the stop order is given, DC injection braking when deceleration to the set frequency. Setting range:0.0~50.0Hz	0.0HZ	96
F22	UP/DOWN Step length	0.00Hz Choose the acceleration time continuous accelerated to the max frequency.Setting range:0.00~2.50Hz	0.00HZ	96
F23	Wire sel	This function is enabled when use terminal operation order. The default is 0: Single wire mode: connect S1 is forward, disconnect S1 is stop. Second wires mode: connect S1 is forward, disconnect S1 is stop, connect S2 is reversal, disconnect S2 is stop. Three wires mode: S1 rising along the trigger, disconnect S2 is stop, S3 level switch and reversing. The default is 1: Single wire mode: S1 rising along the trigger and stop switch Second wires mode: connect S1 is forward, disconnect S1 is stop. S2 level switch and reversing Three wires mode: S1 rising along the trigger is forward,	0	96

NO.	Function name	Description	Factory Default	Page NO.
F23	Wire sel	disconnect S2 is stop, S3 rising along the trigger is reversal The default is 2: Single wire mode: S1 rising along the trigger and stop switch Second wires mode: connect S1 is forward, disconnect S1 is stop. S2 rise along the pulse switch and reversing. Three wires mode: S1 rising along the trigger, disconnect S2 is stop, S3 level switch and reversing. Note: Single wire mode: B01>1 Second wires mode: B01=0 Three wires mode: B01=1	0	96
G01	Fault history1	Only LED manipulator has this functional code. G05-G08 can display the last fault data for the last working time, include EDC output voltage output current output frequency (Only record the following fault: SCUu1OCOU).	NC	97
G02	Fault history2			
G03	Fault history3			
G04	Fault history4			
G05	Fault EDC			
G06	Fault voltage			
G07	Fault current			
G08	Fault frequency			

Notice!

NC means that no fault record.

*1: On condition of 400V, 2 times of voltage up limit and factory value.

*2: Motor rated current output is 10%-200% of AC motor driver rated current.

*3: Factory value changes according to AC motor driver capacity.

*4: Data for reading only.

5.2 Detailed Description of Functional Parameters

A01	Data select	setting limit: 0~7	factory default: 0
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0: changeable data

1: fixed data (user's data is ok, it can be protected without change) 2-6: reserve

7: initialization setting (change to factory defaults) If operator adjust the data with mistake, just change data to & press ENTER key to initialise all the data, then reset.

A02	Control mode sel	setting limit: 0~1	factory default: 1
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0: V/F control, when a AC motor driver drags other AC motor drivers.

1: general no melt current control can improve power.

A03	Oper mode sel	setting limit: 0~9	factory default: 3
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There are two ways (LOCAL and REMOTE) to operate EC5000. They can be selected by combined key "RESET+STOP" only after AC motor driver stops running. The elected operating way will be display on the control panel LCD. AC motor driver is preset to be REMOTE in factory (Through control terminal FV and FI frequency). Multi-function joint input through control terminal S3-S8 is suitable both with LOCAL and REMOTE control.

LOC: frequency and running order is set by operation panel.

REM: select the main frequency and running order according to the following sheet.

setting	Select running order	Select frequency order
0	From control panel	From control panel
1	From control circuit terminal	From control panel
2	From control panel	From terminal FV&FI
3	From control circuit terminal	From terminal FV&FI

setting	Select running order	Select frequency order
4	From control panel	From serial communication
5	From control circuit terminal	From serial communication
6	From serial communication	From serial communication
7	From serial communication	From control panel
8	From serial communication	From terminal FV&FI

A04 Display units setting limit: 0~3999 factory default:0

0:0.01Hz unit

1 : 0.1% unit

2~39 : Setting the point in the fourth value.The 100% frequency value is decided by the third~first value.

For example:The highest frequency value is 1.60 when the ac motor drive working,now the A04 should be set 2160.In the constant pressure water supply application,please unite with F12 mode,then will show the current target pressure is 1.60Mpa.

A05 Stopping method setting limit : 0~3 factory default:0

Select suitable way to stop:

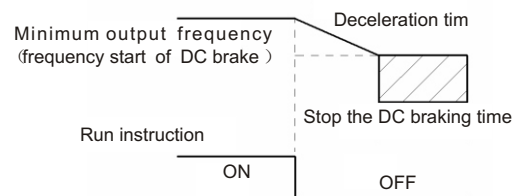
0:low down and stop in first time (factory defaults)

1:slide to stop

2:slide to stop in first retard time

3:slide to stop in second retard time

SETTING 0:low down and stop in first time (factory defaults)



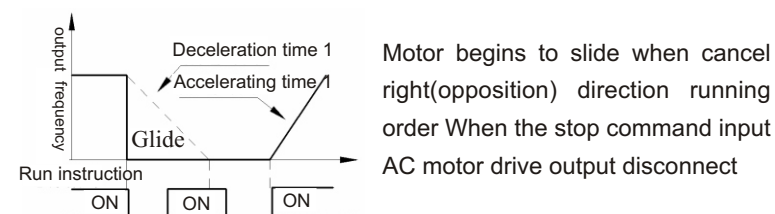
In running order OFF in right and opposite direction, motor retards in retard time 1(A19), and brakes to stop by direct current. If short brake time and big inertia capacity,there will be over voltage(OU)error during retarding. In such circumstances, just extend retard time or install an optional brake resistance (Can be installed in EC5000).

Braking moment of force:

Without brake resistance:20% of motor rated moment force.

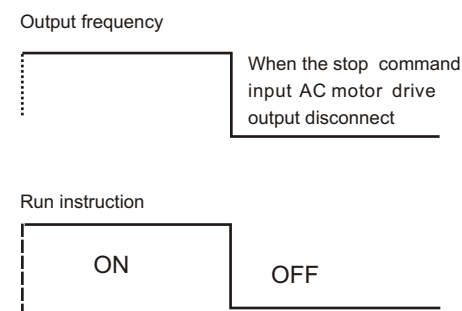
with brake resistance:150% of motor rated moment force.

SETTING1:slide to stop



SETTING2: slide to stop with first retard time

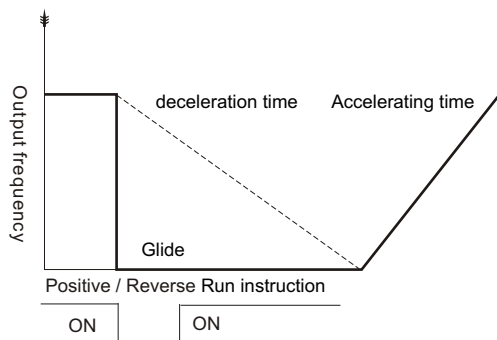
Select increase/decrease speed 1(example)



AC motor driver stops when receiving STOP order and retard to stop. AC motor driver receiving running order and runs after certain time of retard to stop but less than C04 (Min.stop time). AC motor driver stop running during C04 time.

SETTING3: slide to stop with second retard time

Select increase/decrease speed 2(example)



Deliver running order during retard to stop, AC motor driver will not reaction. AC motor driver will start only after retarding time is over. But if retarding times is setting below Min.BB time (C04),running order during BB time is invalid.

A06 Motor Rotation setting limit:0~1 factory default:0

0: motor running direction is anti-clockwise with right running order.

1: motor running direction is clockwise with right running order.

A07 Reverse oper setting limit:0~1 factory default:0

0: running in opposite direction is available.

1: running in opposite direction is not available it refuse opposite running direction order of control circuit terminal or control panel. This setting is suitable for circumstance that opposition running order will cause error.

A08 Input voltage setting limit:150.0V~255.0V factory default:200.0V

Setting AC motor driver input voltage. AC motor driver shift voltage protection according to this value.

A09 V/F selection setting limit:0~15 factory default:15

0~14: select fixed V/F mode. 15 : select free V/F mode.

The following page shows the fixed V/F mode.(the listed voltage is 200V grade, for 400V grade, the voltage is 2 times that of 200V)

■the following must suitable to select the V/F mode:

A. motor voltage and frequency property

B. the highest running speed of the motor

■ Only select high start moment of force on the following circumstance:

(Usually not necessary)

A. long connecting wire(150m or longer)

B. voltage reduce too much during START

C. AC reactor is in AC motor driver input and output

D. Use motor that power is smaller than AC motor driver rated output power.

Purpose	Setting	Starting Frequency	Starting Voltage	Mid Frequency	Mid Voltage	Reference Frequency	Max Voltage	Maxi Frequency
General purpose	0	1.30	6.0	2.50	12.0	50.00	200.0	50.00
	1	1.50	6.0	3.00	12.0	60.00	200.0	60.00
	2	1.50	6.0	3.00	12.0	50.00	200.0	60.00
	3	1.50	6.0	3.00	12.0	60.00	200.0	72.00
Properties of descending torque	4	1.30	5.0	25.00	35.0	50.00	200.0	50.00
	5	1.30	6.0	25.00	50.0	50.00	200.0	50.00
	6	1.50	5.0	30.00	35.0	60.00	200.0	60.00
	7	1.30	6.0	30.00	50.0	60.00	200.0	60.00
High-speed starting torque	8	1.30	7.0	2.50	15.0	50.00	200.0	50.00
	9	1.50	9.0	2.50	20.0	50.00	200.0	50.00
	10	1.50	7.0	3.00	15.0	60.00	200.0	60.00
	11	1.50	1.5	3.00	20.0	60.00	200.0	60.00
Constant output torque	12	1.50	1.5	3.00	12.0	60.00	200.0	90.00
	13	1.50	1.5	3.00	12.0	60.00	200.0	120.00
	14	1.50	1.5	3.00	12.0	60.00	200.0	180.00
	15	1.50	1.5	3.00	12.0	50.00	200.0	50.00

Set motor rated voltage. Calculate fixed V/F mode voltage(A11,A14,A16)

It is 2 times for 400V grade

Set special mode when motor(high speed motor) or machinery need special rotation moment of force adjustment.

The follow conditions should be meet when setting data A10~A17: $A16 \leq A14 \leq A13 \leq A11$

■ Motor rotating moment of force increase with voltage increase in V/F mode, but too much increase will cause such problems:

- 1、Over excitation cause AC motor driver errors.
- 2、Motor overheat and vibrate too much.

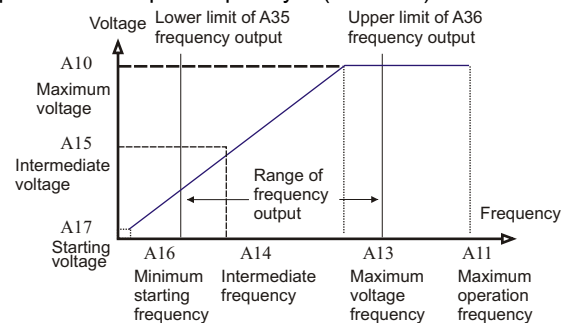
Notice!

When increase voltage, check motor current and increase step by step.

A10	rated voltage	setting limits: 150.0V~255.0	factory default: 200.0V*1
A11	upmost Fre.	setting limits: 50.00Hz~400.00Hz	factory default: 50.00Hz
A12	Max.voltage	setting limits: 0.1V~255.0V*	factory default: 200.0V*1
A13	standard Fre.	setting limits: 0.20Hz~400.00Hz	factory default: 50.00Hz
A14	middle Fre.	setting limits: 0.10Hz~399.99Hz	factory default: 3.00Hz
A15	middle voltage	setting limits: 0.1V~255.0V*	factory default : 12.0V*1
A16	lowest Fre.	setting limits: 0.10Hz~10.00Hz	factory default : 1.50Hz
A17	lowest voltage	setting limits: 0.1V~100.0V*	factory default : 6.0V*

The value of Parameter A35 must be higher than the lower limit of the output frequency of Parameter A36. 100% is the setting value of Parameter 01-00.

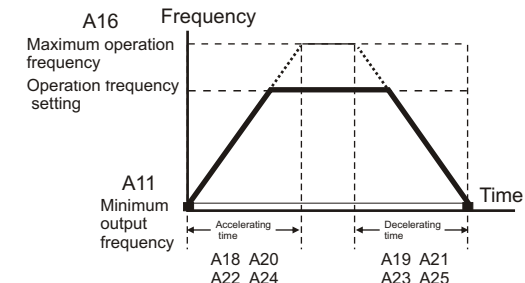
The upper limit of output frequency = $(A11 * A35) / 100$



A18	Accel time1	setting limits: 0.0~3600s	factory default: *3
A19	Decel time1	setting limits: 0.0~3600s	factory default: *3
A20	Accel time2	setting limits: 0.0~3600s	factory default: 10.0s
A21	Decel time2	setting limits: 0.0~3600s	factory default: 10.0s
A22	Accel time3	setting limits: 0.0~3600s	factory default: 10.0s
A23	Decel time3	setting limits: 0.0~3600s	factory default: 10.0s
A24	Accel time4	setting limits: 0.0~3600s	factory default: 10.0s
A25	Decel time4	setting limits: 0.0~3600s	factory default: 10.0s

Accelerate time: Set the output frequency time decide by the start frequency reach the highest frequency time.

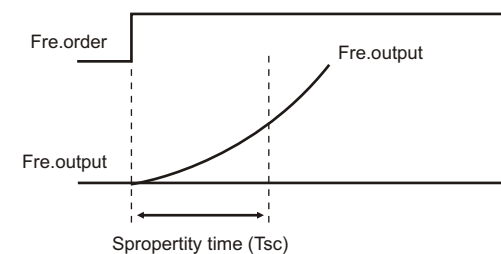
Reduce time speed: Set the output frequency time decide by the start frequency reach the highest frequency time.



Definition of accelerating time/ decelerating time

A26	S_ curve select	setting limits: 0~3	factory default : 1
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To avoid shock taken place on mechanical START/STOP, use S curve to accelerate and reduce speed.

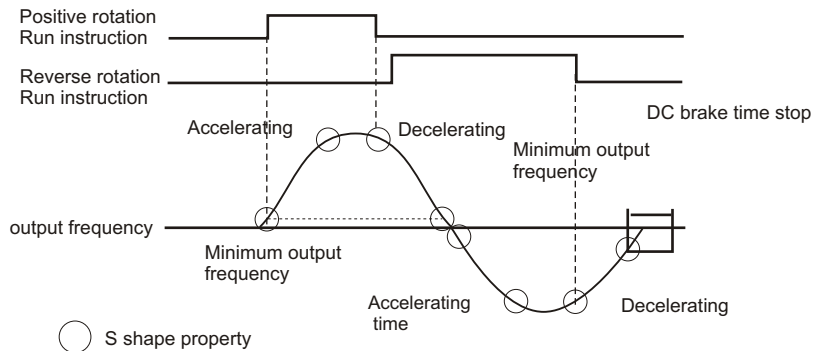


0:No S_curve

1:0.2 Sec.(factory defaults)

2:0.5 Sec.

3:1.0 Sec.



A27 Frequency1	setting limits:0.00 Hz ~400.00Hz	factory default:0.00Hz
A28 Frequency2	setting limits:0.00 Hz ~400.00Hz	factory default:0.00Hz
A29 Frequency3	setting limits:0.00 Hz ~400.00Hz	factory default:0.00Hz
A30 Frequency4	setting limits:0.00 Hz ~400.00Hz	factory default:0.00Hz
A31 Frequency5	setting limits:0.00 Hz ~400.00Hz	factory default 0.00Hz
A32 Frequency6	setting limits:0.00 Hz ~400.00Hz	factory default:0.00Hz
A33 Frequency7	setting limits:0.00 Hz ~400.00Hz	factory default:0.00Hz

Select multi-pace frequency 1 ~7 by ON/OFF combination of terminal function SS1、SS2 or SS4 inner control multi-pace speed.

A34JOG/frequency	setting limits:0.00 Hz ~400.00Hz	factory default: 6.00Hz
------------------	----------------------------------	-------------------------

JOG/START Frequency order is valid when multi-function joint terminal Input selected to be jog/start order or key jog start order.

A35 Freq Upper Limit	setting limits:0%~100%	factory default:100%
A36 Freq Lower Limit	setting limits:0%~100%	factory default:0%

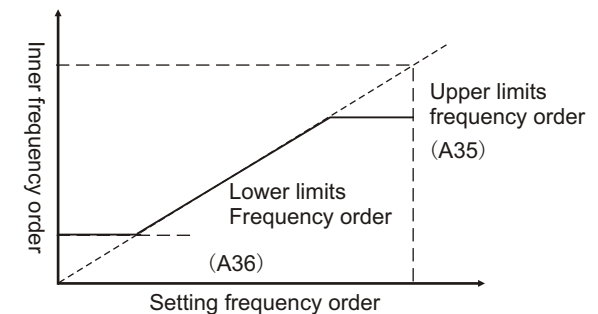
Upper limit Frequency:Set the up limit Frequency with unit of 1% max. Frequency

Lower limit Frequency:Set the lower limit Frequency with unit of 1% max. Frequency

When Frequency order is 0, AC motor driver continue running under

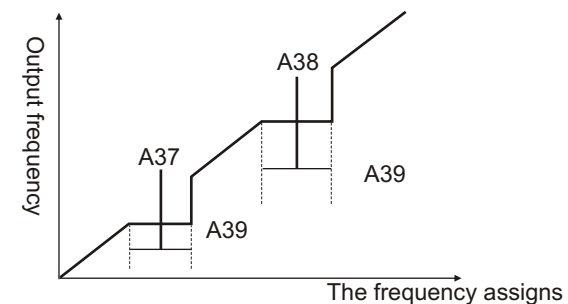
the lower limit. But, if the lower limit Frequency is smaller than min. Frequency output(A16), AC motor driver doesn't work.

The value of Parameter A35 must be higher than the lower limit of the output frequency of Parameter A36. 100% is the setting value of Parameter A11. The upper limit of output frequency = $(A11 \cdot A35) / 100$



A37 Jump freq 1	setting limits:0.00Hz~400.00Hz	factory default:0.00Hz
A38 Jumpfreq 2	setting limits:0.00Hz~400.00Hz	factory default:0.00Hz
A39Jump Band width	setting limits:0.00Hz~25.00Hz	factory default: 1.00Hz

This function forbid or jump the critical frequency for motor to avoid resonance. This function can also used for the dead area control. Set this value to be 0.00HZ, this function is not working. Set jump Frequency 1 or 2:A37≤A38-A39 if this requirement can not be meet, AC motor driver shows constant setting error "PAF".



A40	Running mode	setting limits:0~3	factory default:0
A41	Step 1 mode	setting limits:F1~R4 0~4000S	factory default:F1 0S
A42	Step 2 mode	setting limits:F1~R4 0~4000S	factory default:F1 0S
A43	Step 3 mode	setting limits:F1~R4 0~4000S	factory default:F1 0S
A44	Step 4 mode	setting limits:F1~R4 0~4000S	factory default:F1 0S
A45	Step 5 mode	setting limits:F1~R4 0~4000S	factory default:F1 0S
A46	Step 6 mode	setting limits:F1~R4 0~4000S	factory default:F1 0S
A47	Step 7 mode	setting limits:F1~R4 0~4000S	factory default:F1 0S

Mode running(inner simple PLC logic control):

0:run according to common control way

1:inner control multi-speed, this mode stops after running for one week

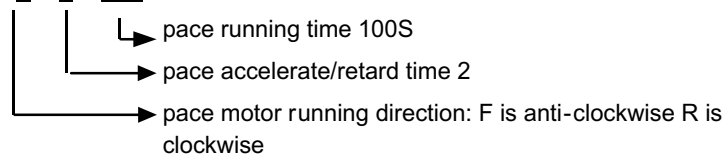
AC motor driver runs with the inner data step by step when run order is given. It stop running automatically one week later. AC motor driver restart when running order is given again.

2:Inner control multi-speed: when repeated running order is given, AC motor driver repeat running step by step according to the inner data. Orders are not accepted except order of STOP, External Error Instant STOP when AC motor driver is running.

3:Inner control multi-speed: after running order is given, AC motor driver runs the inner data step by step. It runs with the last speed after one week.

Program pace:

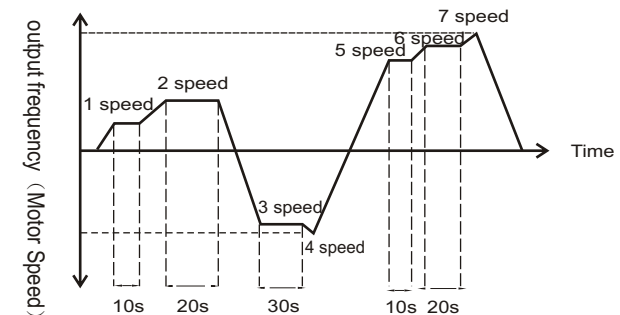
Example: $\overline{F}$ $\overline{2}$ $\overline{100}$



Notice!

Program pace mode function is to set running direction, accelerate/retard time and running time. Set the idle program pace to be "0", they will be jumped and change to the next pace.

FUNCTION	SET VALUE	RUNNING(SET)VALUE
A40 mode running	1	—————
A41 step 1 mode	F1 10.0S	A27 main Frequency
A42 step 2 mode	F2 20.0S	A28 Frequency reference2
A43 step 3 mode	F3 30.0S	A29 Frequency reference3
A44 step 4 mode	R4 0.0S	A30 Frequency reference4
A45 step 5 mode	F2 10.0S	A31 Frequency reference5
A46 step 6 mode	F3 20.0S	A32 Frequency reference6
A47 step 7 mode	F1 0.0S	A33 Frequency reference7



During above running example, if press STOP key, timer also stops. If restart again, it return to the original speed and continue. If need to stop during running, press RESET key.

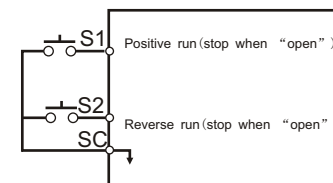
B01	Terminal S2 sel	setting limits:0~26	factory default:0
B02	Terminal S3 sel	setting limits:2~26	factory default:2
B03	Terminal S4 sel	setting limits:2~26	factory default:4
B04	Terminal S5 sel	setting limits:2~26	factory default:9
B05	Terminal S6 sel	setting limits:2~26	factory default:10
B06	Terminal S7 sel	setting limits:2~26	factory default:11
B07	Terminal S8 sel	setting limits:2~28	factory default:12

Multi-function joint S2-S8 input:

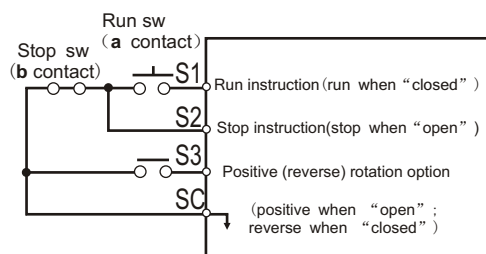
Set	Name	Illustration
0	Opposite running order(2 wire)	Set only on data B01
1	Right/opposite running order(3 wire)	Set only on data B01
2	External error(OFF contacts input)	AC motor driver stop by error when external error signal input
3	External error(ON contacts input)	Stop output, it shows "EF*" on digital display
4	Error reset	Error resume not allowed when input running order
5	Local/remote selection	_____
6	Transmit/control circuit terminal selection	_____
7	Abnormal stop	Retard to stop by retard time 2 when inputing
8	Main Frequency order input selection	Select main Frequency order to input("OFF" for voltage input, "ON" for current input)
9	Multi-speed order 1/SS1	_____
10	Multi-speed order 2/SS2	
11	Multi-speed order 4/SS4	
12	Jog running	_____
13	Accelerate/retard time selection 1/RT1	_____
14	Accelerate/retard time selection 2/RT2	_____
15	External BB(ON joint input)	Slide signal. When input slide signal, motor begin to slide and digital operator shows(BB)
16	External BB (OFF joint input)	

Set	Name	Illustration
17	Searching order from max.Fre.	Speed searching order signal
18	Searching order from setting.Fre.	
19	Data setting permitted/frobidden	Select permitted/forbidden set by digital operator or parallel communication("ON"forbidden, "OFF" permitted)
20	PID resume	_____
21	PID control forbidden	
22	Timer function	
23	OH3 (converter overheat alarm)	Input this signal,digital operator displays "OH3"(flashing),AC motor driver continue running
24	Record given simulate value sample and keep	"ON":simulate Fre.sample "OFF":keep
25	KEB order (input on "ON" joint)	(running retard to instant stop) when AC motor driver applies in special need as fibre circles,adjust running order to OFF. It can be used as instant stop and emergency situation,such as power OFF. Frequency retard when power is off,AC motor driver continues running with this inertia.
26	KEB order (input on "OFF" joint)	
27	UP/DOWN order	Only data B07 can be set,AC motor driver will increase or decrease frequency by 1 unit. The amended frequency is not remembered.
28	JOG inversion	_____

■Set 0, 1:



two wire connecting way(set: 0)



three wire connecting way(set:1)

■Set 5,6:

1.LOCAL/REMOTE selection(set 5)

To select operation by control panel or control circuit terminal.

LOCAL/REMOTE is available when AC motor driver stops.

OFF:run according to operation way(A03)

ON:run according to Frequency order and running order of digital operator.

Example:set A03 to be 3.

OFF:run according to given Frequency from control circuit terminal FV, FI and running order from control circuit terminal S1, S2.

ON: run according to Frequency order and running order from digital operator.

2.Transmit/control circuit terminal selection (SET:6)

Select running order from transmit or control circuit terminal. This selection function is valid only when AC motor driver stops.

OFF:run according to running way selection(A03)

ON:run according to the transmitted Frequency order and running order

■Set 9,10,11:

Frequency set by external joint input terminal and multi-Frequency pre-set by A27~A29.Select 3 input terminal and their function data set to be 9~11,then multi-frequency can be selected by ON/OFF combination. It can offer 8 target value easily through external terminal in OFF multi-garge value control.

Notice!

Combination ON/OFF switch of terminal function SS1、SS2 and SS4 can select 1-7 multistage frequency and JOG frequency.The undefined terminal of function terminal SS1、SS2 and SS4 act as OFF.

Combined joint input signal			Fre selection
11 (SS4)	10 (SS2)	9 (SS1)	
OFF	OFF	OFF	A27 main Fre.
OFF	OFF	ON	A28 pace 2 Fre.
OFF	ON	OFF	A29 pace 3 Fre.
OFF	ON	ON	A30 pace 4 Fre.
ON	OFF	OFF	A31 pace 5 Fre.
ON	OFF	ON	A32 pace 6 Fre.
ON	ON	OFF	A33 pace 7 Fre.
ON	ON	ON	A34 JOG Fre.

■Set 13, 14: select time of accelerating and reducing speed

Select pre-set time for accelerating and reducing speed from outside terminal inputed signal. Appointe 2 input terminals to be function data 13,14,and use to accelerate and reduce speed by ON/OFF key.

Notice!

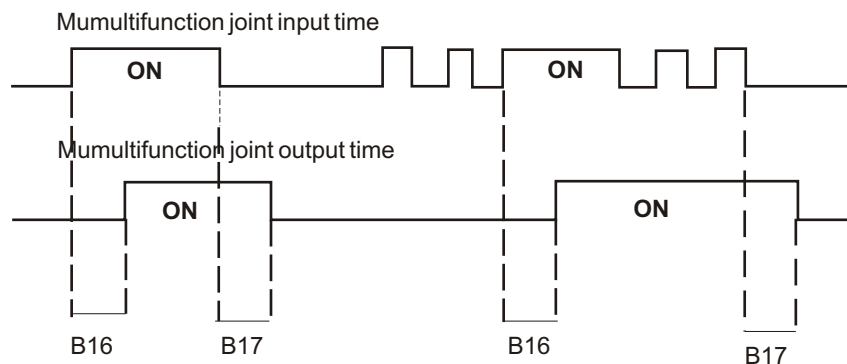
Combination ON/OFF switch of terminal function RT1 and RT2 can select 1-4 accelerate and reduce speed. The undefined terminal of function terminal RT1 and RT2 act as OFF.

Combined signal input		Selected time of accelerating and reducing speed
14 (RT2)	13 (RT1)	
OFF	OFF	A18 1 accelerate, A19 1 reduce speed
OFF	ON	A20 2 accelerate, A21 2 reduce speed
ON	OFF	A22 3 accelerate, A23 3 reduce speed
ON	ON	A24 4 accelerate, A25 4 reduce speed

■ Set 22: timer function

The timer input is on when timer ON is longer than delay timer(B12)ON.

The timer output is OFF when timer OFF is longer than delay timer(B13) OFF.

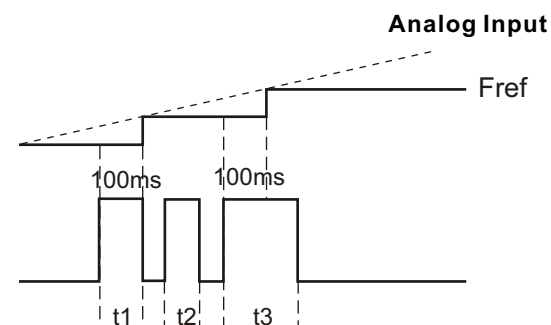


■Setting 24: given simulate value sampling and keep

Simulate Fre. order is sampling when input terminal is "ON" is 100ms or longer. When input terminal is "OFF",the simulate Fre.value is kept.

Notice!

1. Keep the given value when t1,t3 is 100ms or longer.
2. Don't keep the given value when t2 is smaller than 100ms.



■Set 27:UP/DOWN order (set:B07=27)

Only input the effective order,the AC motor driver accelerate/retard when input UP/DOWN order to control circuit terminal S7 and S8 without changing Frequency order. This makes AC motor driver runs at anticipated speed.When UP/DOWN order is appointed by B07, all the function set by data B06 is invalid, and terminal S7 changes to input terminal of UP, S8 changes to be DOWN.

Control circuit terminal S7 (UP order)	ON	OFF	OFF	ON
Control circuit terminal S8(DOWN order)	OFF	ON	OFF	ON
Running status	accelerate	retard	keep	keep

The following figure shows the times sheet when input UP/DOWN order

U=UP(accelerate status) D=DOWN(decelerate status) H=HOLD(keep)

U1=UP status(keep stable on up limit value) D1=DOWN status(keep stable on up limit value)

Notice!

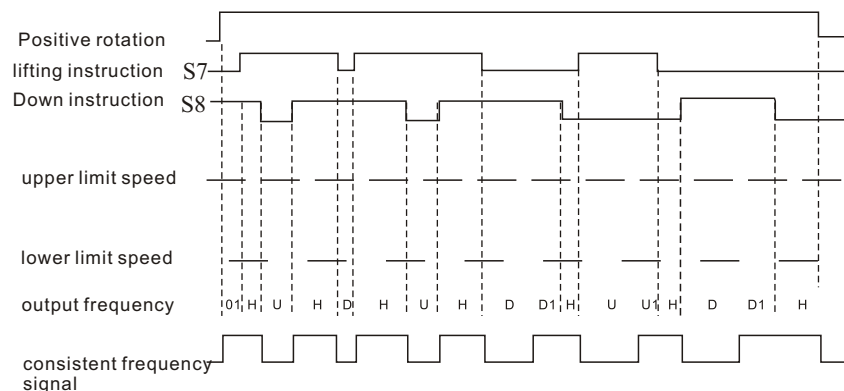
■ Set Frequency up limit value when selecting UP/DOWN order, leave alone Frequency order value.

■The low limit can be from control terminal FV,FI simulate order, the bigger one of AC motor driver order low limit.

■When input right(opposite)running order, AC motor driver start from low

speed limit though there is no UP/DOWN order.

■ If input jog and start order during running with UP/DOWN order, the jog and start order has priority.



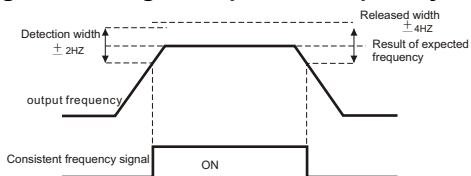
B08 Terminal Y1 sel	setting limits:0~23	factory default:0
B09 Terminal Y2 sel	setting limits:0~23	factory default:1
B10 Terminal Y3 sel	setting limits:0~23	factory default:2
B11 Terminal Y4 sel	setting limits:0~23	factory default:3

Instruction of multi-function output:

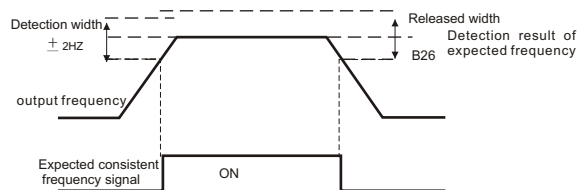
SET	NAME	ILLUSTRATION
0	Fault	switch off on when the ac motor drive fault
1	running	switch off when input right/opposite order or innverter output voltage
2	frequency unanimous	_____
3	any frequency unanimous	_____
4	frequency test	output frequency. ≤ frequency.test standard
5	frequency test	output frequency. ≥ frequency.test standard
6	over torque testing(on)	_____
7	over torque testing(off)	_____

SET	NAME	ILLUSTRATION
8	BB (base level blockade)	switch off when AC motor driver output is off
9	running mode	switch off when select panel operation or frequency.order
10	AC motor driver run ready	switch off when AC motor driver has no error and can run
11	timer function	_____
12	automatic restart	switch off during error and restart
13	OI (overload) alarm	_____
14	Frequency. Given lost	_____
15	transmission data output 1	data output position 1 from RS485 communication
16	transmission data output 2	data output position 2 from Rs485 communication
17	PID feed back lost	_____
18	OH1 alarm	_____
19	Running at Zero_speed	_____
20	Output frequency reach the lower limit Freq	_____
21	Output frequency reach the upper limit Freq	_____
22	Auxiliary pump 1	_____
23	Auxiliary pump 2	_____

■ Setting: 2, setting example of “frequency unanimous signal”



■ Setting: 3, setting example of “any frequency unanimous signal”



B12 ON delay	setting limits: 0S~25.5S	factory default: 0.0S
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B13 OFF delay	setting limits: 0S~25.5S	factory default: 0
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Input/output filter wave. (see page 55)

B14 main simulate value	setting limits: 0~1	factory default: 0
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Main frequency order input way (B14): to input main frequency from control circuit terminal, it can select voltage(0-10V) or current(4-20mA) through setting constant B14.

0: FV, 0~10V input

1: FI, 4~20mA input

B15 supplementary simulate value	setting limits: 0~1	factory default: 1
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Setting constant B15 to change input current of control circuit terminal FI

0: 0~10V input

1: 4~20mA input

Notice!

set PC board SW1-1 to OFF when setting constant B15 to be “0”.

B16 Fre.keep	setting limits: 0~1	factory default: 0
--------------	---------------------	--------------------

This function is valid when select UP/DOWN order for multi-function joint input. Set constant B16 to be “0” when UP/DOWN order is used to keep frequency

0: keep the given value in frequency(constant A27)

1: don't keep

Notice!

When B16 is 0, frequency is kept although AC motor driver power is off.

B17 frequency lost	setting limits: 0~1	factory value: 0
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Select running way on circumstance that control circuit terminal frequency reduces quickly

0: don't treat

1: treat if AC motor driver order reduces 90% with 400ms, AC motor driver continue running in 80% of the pre-set value

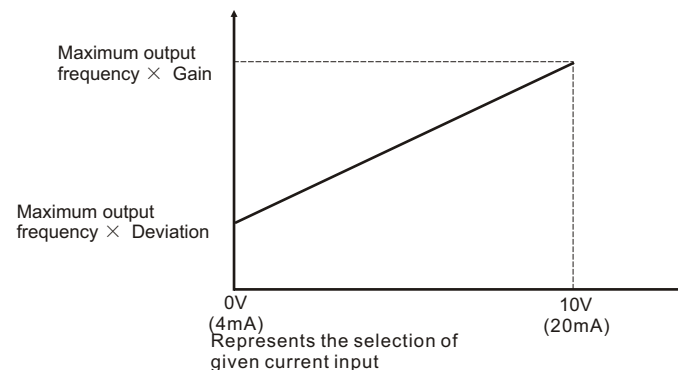
B18 Fre.increase	setting limit: 0%~200%	factory default: 100%
------------------	------------------------	-----------------------

B19 Fre.deviation	setting limit: -100%~100%	factory default: 0%
-------------------	---------------------------	---------------------

When frequency is input by simulate value through control circuit terminal FV and FI, appointe deviation and increase can be set related to the simulated input frequency.

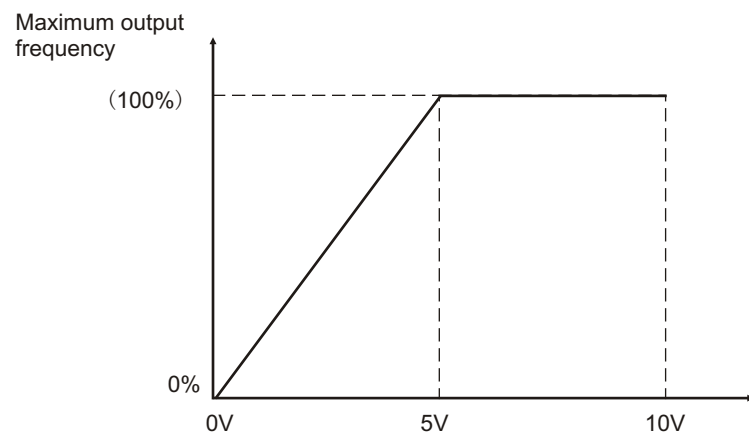
■ Frequency order increase: frequency order set by 1% unit simulate input value 10V(20mA) max.frequency output: 100%.

■ Frequency order deviation: frequency order set by 1% unit simulate input value 0V(4mA) max.frequency output: 100%.

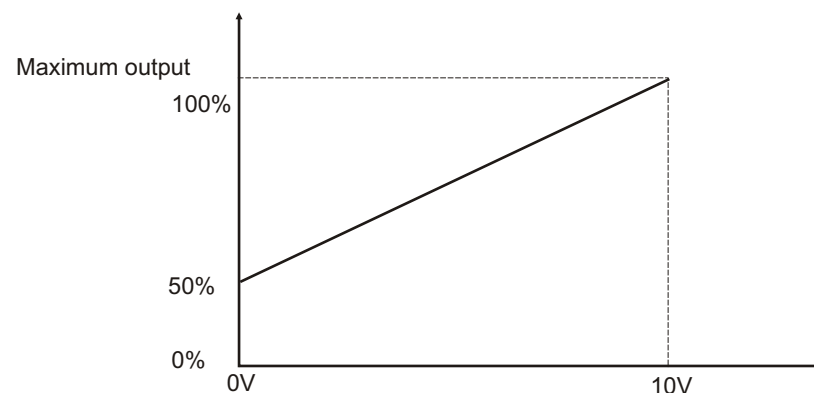


■ Examples

AC motor driver runs in 0%-100% frequency order when the input voltage is 0-5V, increase: B18=200, deviation: B19=0



AC motor driver runs in 50%-100% frequency order when the input voltage is 0-10, Increase: B18=10, deviation: B19=50



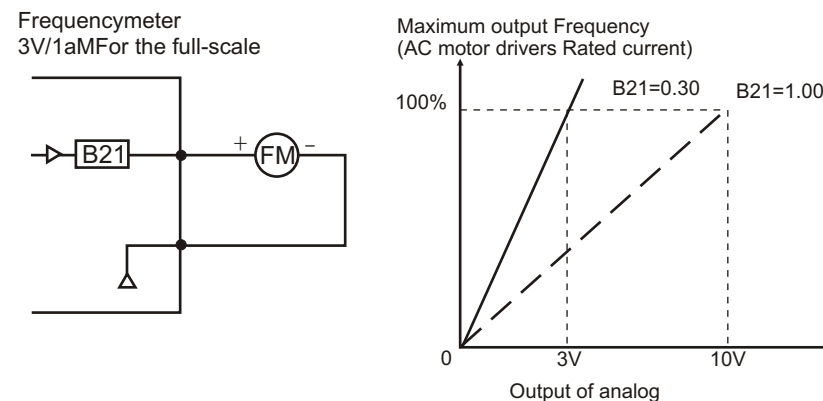
B20 F M A function	setting limits: 0~3	factory default: 0
B21 F M A function	setting limits: 0.01~2.00	factory default: 1.00

In order to monitor, send the output Frequency and the output current to the simulate output terminal FMA-FC

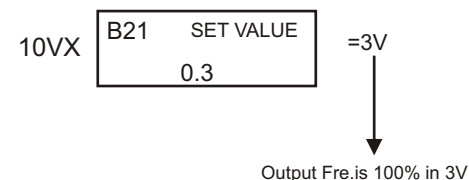
■ F M A function:

- 1: current output (10V AC motor driver rated current)
- 2: power output (10V AC motor driver rated current)
- 3: DC (10V/400V (200V grade), 10V/800V (400V grade))

■ F M A increase: correct Fre. meter and galvanometer(B21) to adjust simulate output increase



Set simulate output voltage in 100% Fre. output. Fre. meter shows 0-60Hz in 0-3V



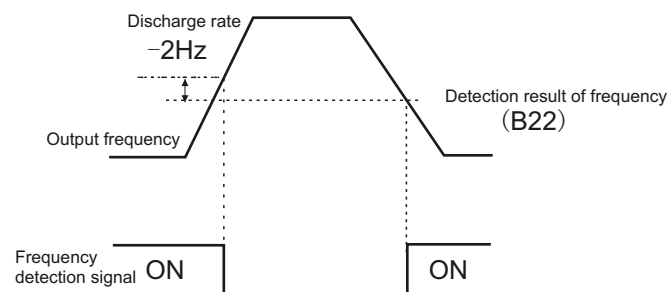
B22 frequency test	setting limit: 0.00Hz~400.00Hz	factory default: 0Hz
B23 FAR value	setting limit: 0.00Hz~25.00Hz	factory default: 2Hz

It is valid when multi-function joint input set to be "Fre.test"(set value: 4 OR 5)

■ Frequency test: "frequency test" is functioning when output frequency is over or lower than frequency test standard B22.

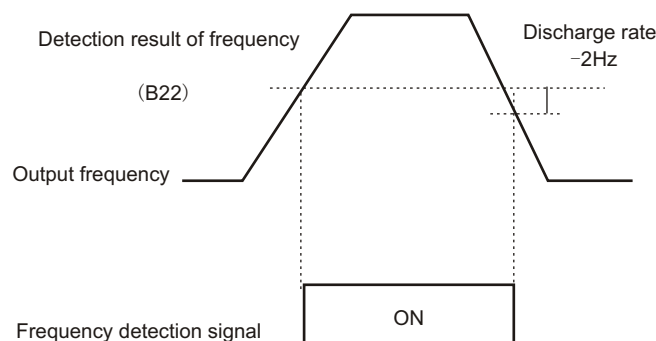
■ FAR value: frequency test release width

Frequency test multi-function joint input set to be "4" (Frequency output $\leq$ Frequency test standard)



Frequency test multi-function joint input set to be "5"

(Frequency output $\geq$ Frequency test standard)



B24 G/P choose setting limits: 0~1 factory default: *3

0: constant torque of G, the coefficient of over load is 150%1min

1: fan-type pumps of P, the coefficient of over load is 120%1min

Notice!

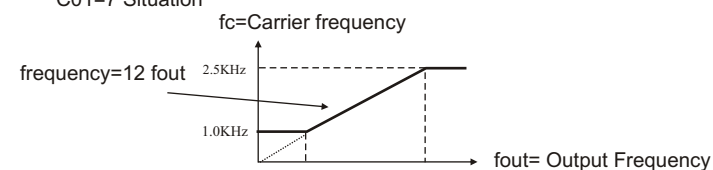
When change this parameters, C18 will change following this. When 0 change to 1 the power of AC motor driver more bigger.

C01 carrier wave frequency setting limits: 1~9 factory default: *3

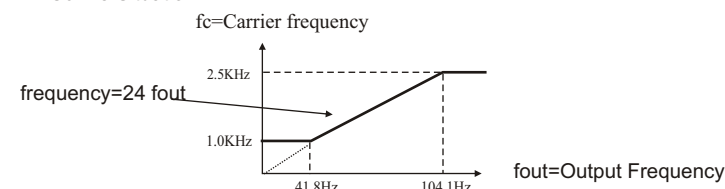
Set AC motor driver output transistor ON/OFF frequency carrier wave

SET	CARRIER WAVE (KHZ)	METAL NOISE FROM MOTOR	DISTURB NOISE AND LEAKAGE CURRENT
7	12 Fout	big ↑ small	less ↑ more
8	24 Fout		
9	36 Fout		
1	2.5		
2	5.0		
3	8.0		
4	10.0		
5	12.5		
6	15.0		

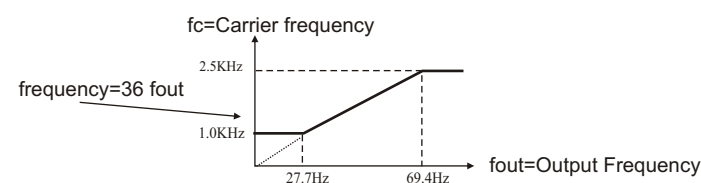
C01=7 Situation



C01=8 Situation



C01=9 Situation



C02 instant stop running setting limit: 0~2 factory default: 0

0: Don't continue running.

1: Resume power during instant power off compensation time(C06), AC motor driver continue running.

2: AC motor driver continue running when power is resume to normal value in control logic time, and there is no Uul fault.

Notice!

Keep running order to continue running from instant power off..

C03 SpdSrch Current setting limits: 0%~200% factory default: 110%

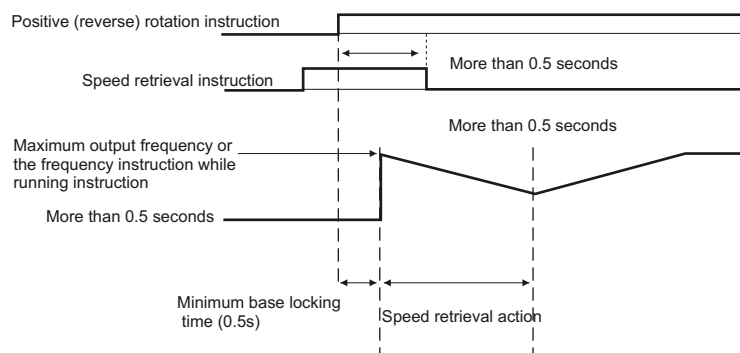
C04 Min Baseblock t setting limits: 0.5S~5.0S factory default: *3

This order restart the sliding motor. This function enable motor to shift smoothly between working frequency and inverted frequency.

■ Search speed: search speed is setting current grade, AC motor driver rated current is 100%.

■ Block time: during speed searching, set in dealing instant power off, the minimal time unit to switch off AC motor driver is 0.1 SEC.

Select(constant B01~B07): "17" (searching order from max.Fre.output) or "18" searching order from given frequency. Set up an order that makes AC motor drive runs in right/opposite order after AC motor driver searching appointed same period of time or later. If running order is input before searching order, searching order is invalid. The following is the time figure when inputing searching order.



C05 SpdSrch V/f setting limits: 0%~100% factory default: *3

Set decreasing standard of speed searching time V/F. During speed searching, $V/F = (V/F \text{ during common running}) \times (C05)$.

C06 instant stop time setting limits: 0.0S~2.0S factory default: *3

Set compensation instant power off.

C07 auto-retry

setting limits: 0~10

factory default: 0

Set AC motor driver self diagnose and restart times when error occurs.

Set AC motor driver re-start and error test resume after error occurred. Auto diagnose and re-try times can be set to 10 times in C07. AC motor driver will auto re-start when the following errors occurred.

1. OC (over-current) 2. OU (over-voltage)
3. UV1 (low voltage PUV)
4. GF (grounding error)
5. rr (braking transistor error)

Notice!

Set to 0 for retry times in the following circumstance:

1. If there is no other errors occurred 10 minutes after re-try.
2. Error resume signal is "ON" when error tested.
3. Power "OFF".

C08 retry joint

setting limits: 0~1

factory default: 0

Error selection during auto-retry:

- 0: "ON", during error re-try
1: "OFF", during error re-try

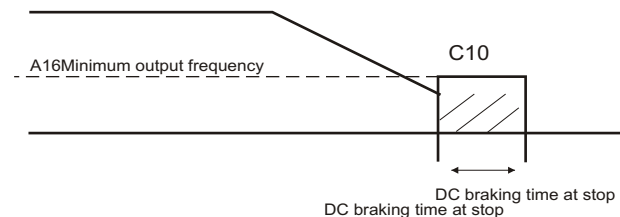
C09 DCInj Current

setting limits: 0%~100% factory default: 50%

Set DC current value when braking, AC motor driver rated current is 100%

C10 DCInj Time @ Stop setting limits: 0.0S~10.0S factory default: 0.5S

Set the DC braking time when AC motor driver stops. If set to be 0.0S, AC motordriver don't execute DC braking time, but output "OFF" when beginning braking.

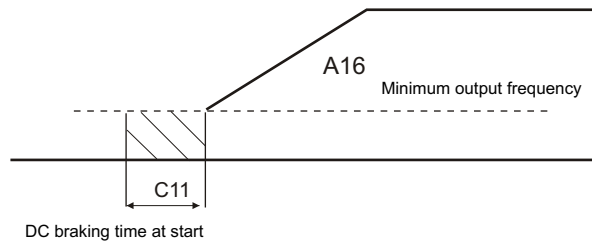


If stop mode(A05)selected to be slide to stop,AC motor driver don't execute DC braking when AC motor driver stops.

C11 DCInj Time@Start setting limits: 0.0S~10.0S factory default: 0.0S

DC braking time when starting

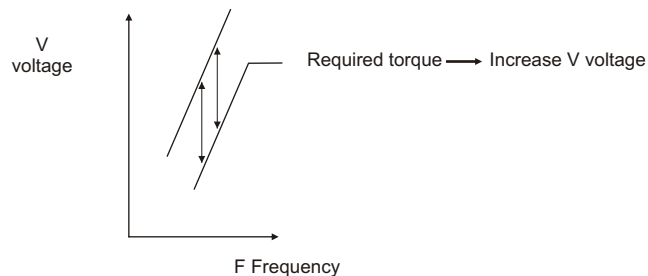
Enables motor to re-start from sliding to stop, set constant C09 DC braking time when starting. If constant C09 is set to be "0.0S", DC braking is invalid, AC motor driver accelerate to start in min. Fre.output.



C12 rotating moment of force compensation setting limits: 0.0~3.0 factory default: 1.0

Auto rotation moment of force compensation

Motor rotation moment of force may be change according to the load capacity.Full scale rotation moment of force increase may adjust V/F mode voltage according to needs. EC5000 AC motor driver adjust voltage automatically in constant and accelerating running speed. The needing torque is counted by the ac motor drive which can ensure no tripping and can save more energy.Output voltage $\propto$ Torq cmp gain(C12)X Needing torque



Usually don't need to adjust rotation moment of force compensation(factory setting C12:1.0)Rotation moment of force need to be adjusted when connection wire between AC motor driver and motor is too long or motor vibrating. Increase compensation to increase motor moment of force. But there will be problems if increase too much

- AC motor driver run in unstable status because of motor over curren
- Motor overheat or vibration.

Check motor current when increasing moment of force compensation.

C13 wire resistance setting limits: 0.0R~65.530R factory default: *3

C14 motor iron loss setting limits: 0W~9999W factory default: *3

The moment of force data in AC motor driver is pre-set already and don't need to change.

C15 rotation difference increase setting limits: 0.0%~9.9% factory default: 0.0%

Motor loading rotating moment of force difference lead to different motor speed. Rotation difference compensation is increasing AC motor driver output frequency by propotion of motor loading capacity moment of force to decrease motor speed difference.

C16 empty load current setting limits: 0%In~99%In factory default: 30%In

Set motor current with empty load, motor rated current is 100%In

C17 correct delay setting limits: 0.0S~25.5S factory default: 2.0S

Set correct delay data in wave filtering.

C18 rated current setting limits: 10%In~200.0%In factory default: *3

Set rated current value for motor data plate, take the electronic overheat protector as motor protecting standard current.

C19 overload protection setting limits: 0~4 factory default: 1

AC motor driver inner overheat relay protects motor overheat.

Set correctly as follows:

- 0 : not protected
- 1 : standard motor (time constant 8 minutes)
- 2 : standard motor (time constant 5 minutes)

3 : AC motor driver motor (time constant 8 minutes)

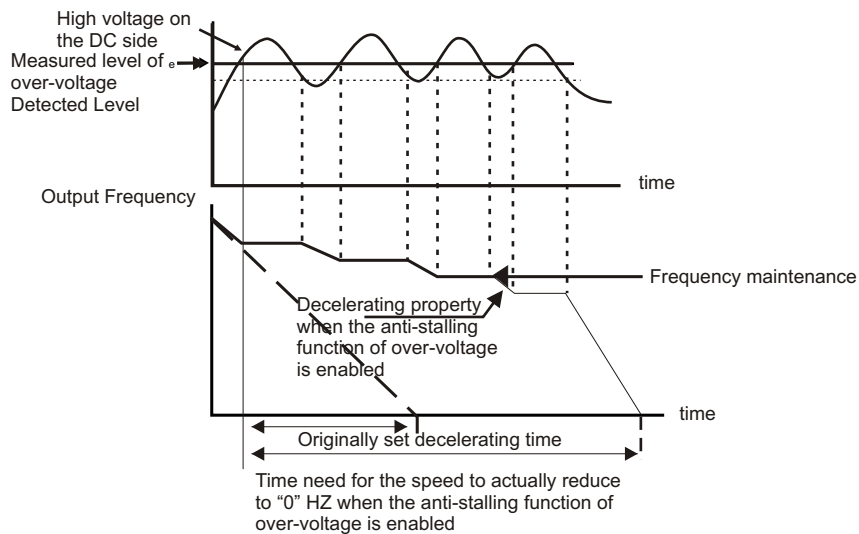
4 : AC motor driver motor (time constant 5 minutes)

Electronic overheat protection is monitoring motor temperature to protect it from overheat by simulate of AC motor driver output current/frequency and time. When electron overheat relay is functioning it gives "OL1" report and cut off AC motor driver output to avoid motor overheat. If there is only one motor connected to a AC motor driver, external heat relay in not needed. If more than one motor is connected to a AC motor driver, each motor need to install heat relay and set constant(C19)to be "0".

C20 retard and speed loss setting limits: 0~1 factory default: 1

0: without speed loss protection function during retard

1: with speed loss protection function during retard



C21 accelerating standard setting limits: 30%In~200.0%In factory default: *3

Set speed loss protecting action standard with unit of 1% and AC motor driver rated current 100%.

C22 running standard setting limits: 30%In~200.0%In factory default: *3

Set speed loss protecting action standard with unit of 1% and AC motor driver rated current 100%.

C23 rotation moment of force test setting limits: 0~4 factory default: 0

0: without over moment of force testing

1: test only in constant speed, it continue running after testing

2: test during running, it continue running after testing

3: test only on constant speed, AC motor driver is "OFF" after testing

4: test during running, AC motor driver output "OFF" after testing

Set it to be 2 or 4 to test over rotation moment of force during accelerating or retard.

Set it to be 1 or 2 to keep it running after testing over rotation moment of force. Operator displays "OL3"(flashing) alarm during testing.

Set it to be 3 or 4 to temporary stop AC motor driver during over rotation moment of force testing. Operator displays "OL3" error(light on) during testing.

C24 rotation moment of force standard setting limits: 30%In~200.0%In factory default: 160%

Over rotation moment of force test standard: set over rotation moment of force testing current standard with unit of 1%.

C25 over rotation moment of force setting limits: 0.1S~10.0S factory default: 0.1S

Over rotation moment of force testing time: If the time of motor current surpassing rotation moment of force testing standard(C24) is longer than testing time(C25), over rotation moment of force testing function works.

C26 SPI standard setting limits: 1%~100% factory default: 20%

Set input phase missing test grade, with unit of 1%, DC400V (200V grade) and DC800V(400Vgrade) to be 100%.

C27 SPI delay setting limits: 2S~255*1.28S factory default: 8S

Input phase missing test time test time=1.28sec× (C27's value)

C28 SPO standard setting limits: 1%~100% factory default: 0%

Set output phase missing test grade, with unit of 1%, AC motor driver rated current to be 100%.

C29 SPO delay	setting limits: 0.0S~2.0S	factory default: 0.2S
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Set output missing test time

C30 power selection	factory default: *3
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Read only,display AC motor driver power grade

C31 time select	setting limits: 0 ~1	factory default: 1
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0: total total time of accumulative when ac motor drive is power on

1: total time of accumulative when ac motor drive is running

C32 timer L	setting limits: 0H ~9999H	factory default: 0H
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C33 timer H	setting limits: 0~27*10000H	factory default: 0H
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When C32 is selected to be action total time, set C32 to be time with unit of 1 hour,and calculate time from then on.

D01 PID selection	setting limits: 0 ~3	factory default: 0
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0: without PID control

1: with PID control(D controls deviation)

2: with PID control(D controls feedback value)

3: with PID control(feedback value is in opposite direction)

■Set target value:

EC5000 AC motor driver can select several target value. Use voltage signal of control circuit terminal FV or frequency order data A27-A34 to set target value.

1. voltage signal of control circuit terminal FV(0-10): select(A03) to be 2 or 3 to set running direction.

2. frequency order data(A27-A34): select(A03) to be 0 or 1 to set running direction (combination of multi-function joint, multi-pace speed order and jog/start order)

■Set feedback value:

Use current signal(4-20mA) or voltage signal(0-10V) of control circuit terminal to set feedback value.

1. Current signal of control circuit terminal FI: select(B15) to be 1 to set FI function.

2. Voltage signal of control circuit terminal FI: select(B15) to be 0 to set FI function (set PC board SW1-1to be OFF)

D02 feedback increase	setting limits: 0.00 ~10.00	factory default: 1.00
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D03 propotion increase	setting limits: 0.0 ~10.0	factory default: 1.0
------------------------	---------------------------	----------------------

D04 integral time	setting limits: 0.0S ~100.0S	factory default: 10.0S
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D05 differential time	setting limits: 0.00S~1.00S	factory default: 0.00S
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D06 PID deviation	setting limits: -109%~109%	factory default: 0%
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D07 integral limits	setting limits: 0% ~109%	factory default: 100%
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D08 wave filting time	setting limits: 0.0S~2.5S	factory default: 0.0S
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■Feedback increase: small adjustment for PID feedback test value.

■Proportion increase: set P control proportion increase. If set to be 0.0, no P control.

■Integral time: set I control proportion increase. If set to be 0.00, no I control.

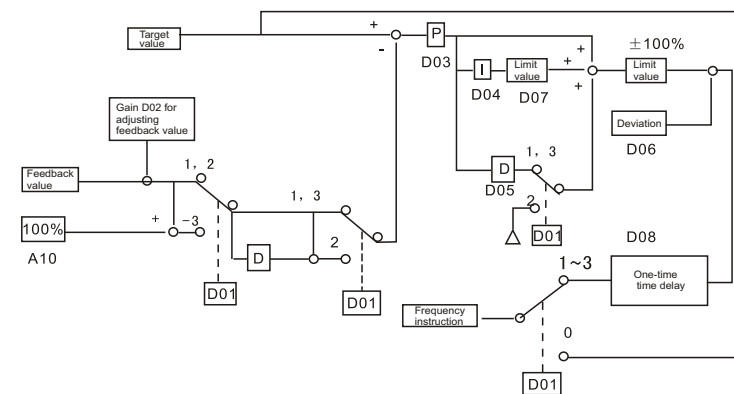
■Differential time: set D control proportion increase. If set to be 0.0, no D control.

■PID deviation: deviation adjustment to frequency order control by PID, with unit of 1%.

■Integral limits: set the up limits value of frequency output controlled by I, with unit of 1%.

■Wave filting time: set the one time delay data of frequency order controlled by PID

PID Control Function Block Diagram



D09 feedback test setting limits: 0 ~1 factory default: 0

Test feedback lost (PID) :

0: feedback lost test with PID

1: feedback lost test without PID

D10 standard lost setting limits: 0% ~100 % factory default: 0%

Feedback lost test standard(PID), set losing grade of PID feedback with unit of 1%.

D11 time lost setting limits: 0.0S~25.5S factory default: 1.0S

Delayed feedback lost time(PID), set testing PID feedback lost time

Notice!

Resume value I to O in the following circumstance

1. Input stopped order or stopping.

2. When inputting integral value resume signal with multi-function joint terminal(set any one of constant B01-B07 to be 20).

3. The upper limit of I can be set by constant D07. Increase value of constant D07 can improve integral control. If control system vibrating can not be stop by adjust integral time or delay data, just decrease constant D07.

4. PID control can be cancel by signal from multi-function joint input.

5. Set any one of constant B01-B07 to be 21, and switch on this joint during running, PID is cancelled. The anticipated value signal is used as frequency order signal.

D12 Pump Control setting limits: 0~3 factory default: 3

0~2: The number of opening pumps in the constant pressure water supply control

3: close the pump control

D13 Rotation time setting limits: 0-10000min factory default: 60min

When the two auxiliary pumps only one work, in order to average the time of working for every pump, the working time for one pump is D13 and then change to work another one.

D14 Interlock time setting limits: 0~250S factory default: 5S

This is the time of the two auxiliary pumps all stopping.

D15 High-speed working setting limits: 0~250S factory default: 60S

When the water consumption is increasing, the ac motor drive is working on the max frequency, when it reach the setting time D15, the corresponding multi-functional contact action

D16 Low-speed working setting limits: 0~250S factory default: 60S

When the water consumption is reducing, the ac motor drive is working on the min frequency, when it reach the setting time D16, the corresponding multi-functional contact action

D17 Low-speed working setting limits: 0~150% factory default: 95%

D18 Stopping time setting limits: 0~250S factory default: 30S

When the water consumption is reducing, all of the auxiliary pumps have turned off, the main pump are working on the min frequency, when meet the following conditions:

1: (setting frequency/max frequency)*D17 < PID feedback value

2: The time exceed D18

The ac motor drive stops output, and be in sleep mode

D19 Wake-up level setting limits: 0~150% factory default: 80%

D20 Wake-up time setting limits: 0~250S factory default: 20S

The ac motor drive is in sleep mode. When the water consumption is increasing, the pressure of the pump will reduce accordingly. When meet the following conditions:

1: (setting frequency/max frequency)*D19 > PID feedback value

2: The time exceed D19

The ac motor drive begins outputting, the pump starts working.

E01 energy saving selection setting limits: 0~1 factory default: 0

E02 energy saving increase setting limits: 0.00~655.00 factory default: *3

E03 60Hz voltage setting limits: 0~120% factory default: 50%

E04 6Hz voltage setting limits: 0~25% factory default: 12%

Energy saving selection

0: energy saving control invalid

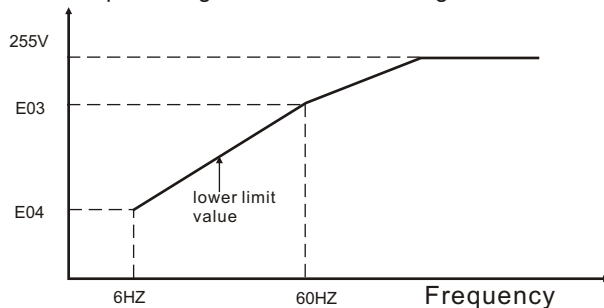
1: energy saving control valid

The constant used in energy saving control mode is pre-set to be best in factory. It is no need to be adjusted in normal running. If the motor property is different

from EC5000 standard motor, please change the constant according to the following illustration.

■Energy saving coefficient (E02) : Use energy saving coefficient in energy saving running mode to calculate the best effective voltage, and input it as given voltage. This value is pre-set by factory according to EC5000 standard motor data. Input voltage increase with energy saving coefficient.

■Energy saving voltage lower limits value (E03, E04) : Set voltage output lower limits value. If the given voltage value is smaller than the appointed lower limits value in energy saving mode, then this lower limits value is taken as given voltage output value. Set lower limits value to avoid speed loss in light load capacity. Set voltage limits in 6Hz or 60Hz voltage outside 6Hz and 600Hz is set by linear with the percentage of motor rated voltage.



Notice!

For 400V grade, this value is 2 time of 200V.

E05 calculating time	setting limits: 1~200	factory default: 1
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Set average power calculating time in energy saving mode.

E06 voltage limits value	setting limits: 0~100%	factory default: 0%
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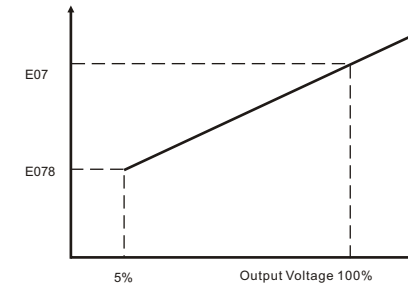
E07 100% anti-jump	setting limits: 0.1~10.0%	factory default: 0.5%
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E08 5% anti-jump	setting limits: 0.1~10.0%	factory default: 0.2%
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In energy saving control mode, best voltage is calculate according to the load capacity power. But, the setted parameters may be change with temperature or motor from other factory. So,it can not offer best voltage in certain circumstance. Best running is achieved through minimum voltage adjustment.

■Voltage limits value: control voltage through best running. Set with the percentage of motor rated voltage. It can not be set if set percentage to be 0.

■The best running voltage range (E07, E08) : Set a best voltage change -ing range in a best running circle. It is set with the percentage of motor rated voltage. Ncrease this value,motor speed increase. This voltage range is set in start voltage 100% and 5%. Other voltage value can be set through linner value.



F01 MODBUS Address	setting limits: 0~31	factory default: 0
F02 MODBUS Baud Rate	setting limits: 0~5	factory default: 0
F03 MODBUS Parity	setting limits: 0~5	factory default: 3

Local add:

0: AC motor driver break away from RS485 general control address, non controlled address.

1~31: controlled address of AC motor driver RS485 communication.

It is necessary to set controlled address to avoid number repeat with other controlled address in the same transmitting wire.

band:

0: 1200BPS	1: 2400BPS
2: 4800BPS	3: 9600BPS
4: 19200BPS	5: 38400BPS

Modbus mode:

0:7N2 For ASCII	1:7E1 For ASCII
2:7O1 For ASCII	3:8N2 For RTU
4:8E1 For RTU	5:8O1 For RTU

Please refer to Chapter 6 of the EACN MODBUS communication protocol in the data structure the contents of the section.

F04 transmitting run time setting limits: 0~1 factory default: 1

Set run-time test with MODBUS communication:

0: without run-time test

1: with run-time test

F05 C E stop setting limits: 0~3 factory default: 1

Stop method of communication error(EC):

0: retard to stop(with retard time1)

1: slide to stop

2: retard to stop(with retard time2)

3: continue running(alarm)

F06 O H stop setting limits: 0~3 factory default: 3

Stop way when radiator overheat:

0 : retard/stop 1(fault)

1 : free stop

2 : retard/stop2(fault)

3 : continue running(alarum)

F07 DBR over heat setting limits: 0~1 factory default: 0

Braking resistance overheat protection function:

0: without braking resistance overheat protection

1: with braking resistance overheat protection

F08 L / R function setting limits: 0~1 factory default: 0

0 : LOCAL/REMOTE key function: invalid

1 : LOCAL/REMOTE key function: valid

F09 L / R selection setting limits: 0~1 factory default: 0

0: When LOCAL/REMOTE shifting, re-run is valid when stop order is inputed

1: When LOCAL/REMOTE shifting, re-run is valid at once

F10 enter key setting limits: 0~1 factory default: 1

0 : STOP key is always valid in any operating mode

1 : STOP key is valid when operator is running within operator running order

F11 Oper Enter Key setting limits: 0~1 factory default: 1

0 : "ENTER" key not used when set frequency order with operator

1 : "ENTER" key used when set frequency order with operator

F12 Variable Selection setting limits: 0~2 factory default: 1

Only LCD manipulator has this functional code

0: m/s

1: Mpa/mm²

2: Kg/ mm²

Pr-F12 fre set select setting limits: 0~1 factory default: 1

Only LCD manipulator has this functional code

0:Fre. set by key button number

1:Fre. set by key potentiometer adjustment

F13 LCD brightness setting limits: 0~10 factory default: 0

Only LCD manipulator has this functional code

Used to adjust the brightness of LCD display

Pr-F13 data rewrite setting limits: 0~2 factory default: 0

Only LCD manipulator has this functional code

0: Data copy

1: Data check

2: Data write

F14 monitoring select setting limits: 0~6 factory default: 0

Only LCD manipulator has this functional code

0: setting frequency

1: output frequency

2: output current

3: output voltage

4: output power

5: voltage EDC

6: feedback PID

Pr-F14 monitoring select setting limits: 0~11 factory default: 0

Only LED manipulator has this functional code

0:setting frequency

- 1:output frequency
- 2:output voltage
- 3:output current
- 4:output power
- 5:voltage EDC
- 6:feedback PID
- 7:temperature
- 8:S terminals functional
- 9:Y terminals functional
- 10:running time
- 11:version ROM

F15 Language Selection setting limits: 0~1 Default default: 0

Only LCD manipulator has this functional code

- 0:Display Chinese
- 1:Display English

Pr-F15 LED Display sel Range:0~3 factory default:0

Only LED manipulator has this functional code

0:seven items for monitoring:(Fset、Fout、Vout、Aout、KVA、EDC、PID)

1:increase two external terminals S1-8 and Y1-4 for monitoring the input and the output

2:increase three items for monitoring:TEP、HOU、the VER of mother board

3:increase five items which monitored above 1&2

F16 Low_speed sel(Pr_F15) setting limits:0~2 factory default:0

Set the input voltage of the ac motor drive.According to this set value, the ac motor drive can switch the voltage protection level.

- 0:Free running;
- 1:Running at A16(start freq)
- 2:Running at Zero_speed.

F17 Zero_speed increase(Pr_F16) setting limits:0~100% factory default:50%

According to the rating current of 100% set the output current at zero

speed

F18 Motor tuning(Pr_F17) setting limits:0~2 factory default:0

0:no auto tuning;

1:static auto tuning(Suitable for use in already connected load motor);set the F18 to be 1,and start the ac motor drive can realize the measure of the stator resistor.

2:Dynamic auto tuning(Suitable not connected to the load of the motor) blongs to the stator resistance type self-learning and no-load current type study, through self-learning between resistance and no-load current of the motor can be obtained, the test motor running at rated frequency.

F19 Electrical leakage(Pr_F18) setting limits:0~40% factory default:18%

With motor set by 100% of the rated voltage for motor voltage which is caused by the leakage inductance of the amount of pressure drop

F20 AVR(Pr_F19) setting limits:0~1 factory default:1

- 0:NoAVR;
- 1:AVR;

F21Brakfrequency(Pr_F20)setting limits: 0~50.00Hz factory default:0.0Hz

0.00Hz The function is invalid.

0.1~50Hz When the stop order is given, DC injection braking when deceleration to the set frequency.

F22 U/D Step length setting limits:0.00~2.50Hz factory default:0.00Hz

When the input multi-function node choose UP/DOWN order,this function is valid.Use the memory of the UP/DOWN order to retain the frequency(when it is power off).Set the constant F22 to be "0".

- 0:keep the given value in frequency(constant A27)
- 1:No reserve

F23 Wire sel (Pr_F22) setting limits:0~2 factory default:0

This function is valid when use the terminal operation order. The default is 0:Single wire mode: connect S1 is forward, disconnect S1 is stop

Second wires mode: connect S1 is forward, disconnect S1 is stop, connect S2 is reversal, disconnect S2 is stop.

Three wires mode: S1 rising along the trigger, disconnect S2 is stop, S3 level switch and reversing.

The default is 1: Single wire mode: S1 rising along the trigger and stop switch

Second wires mode: connect S1 is forward, disconnect S1 is stop. S2 level switch and reversing.

Three wires mode: S1 rising along the trigger is forward, disconnect S2 is stop, S3 rising along the trigger is reversal

The default is 2: Single wire mode: S1 rising along the trigger and stop switch

Second wires mode: connect S1 is forward, disconnect S1 is stop. S2 rise along the pulse switch and reversing.

Three wires mode: S1 rising along the trigger, disconnect S2 is stop, S3 level switch and reversing.

Note: Single wire mode:B01>1 Second wires mode:B01=0 Three wires mode:B01=1

G01	fault history1	setting limits:read only	factory default:NC
G02	fasult history2	setting limits:read only	factory default:NC
G03	fault history3	setting limits:read only	factory default:NC
G04	fault history4	setting limits:read only	factory default:NC
G05	fault EDC	setting limits:read only	factory default:NC
G06	fault voltage	setting limits:read only	factory default:NC
G07	fault current	setting limits:read only	factory default:NC
G08	fault frequency	setting limits:read only	factory default:NC

Only LED manipulator has this functional code.G05-G08 can display the last fault data for the last working time, include EDCoutput voltageoutput currentoutput frequency(Only record the following fault:SCUu1OCOU).

NC represents:No fault record

*1 represents: Upper limit and default value of voltage, double under 400V.

*2 represents: The rated current range of motor is 10%~200% of that of AC motor driver.

*3 represents: The default value will be different according to the capacity of AC motor driver.

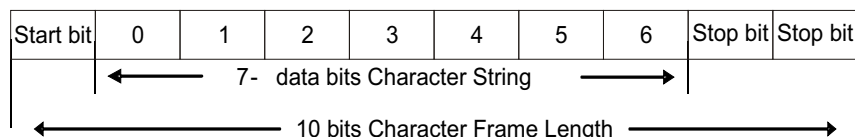
*4 represents: read-only value.

EC5000 Series of AC Motor Driver adopts the communication protocol of Modbus networks. Modbus can adopt two data coding modes: either ASCII (American Standard Code for Information Interchange) or RTU(Remote Terminal Unit). ASCII coding transmits data after converting the data into ASCII codes, while RTU transmits data directly without conversion. The following demonstrates the coding method of ASCII data format. Each byte is consisting of 2 ASCII characters. For example: Value 64 Hex can be represented by '64' in ASCII, i.e., '6' (36Hex) and '4' (34Hex). The following is a mapping table of ASCII Characters '0'... '9', 'A'... 'F'.

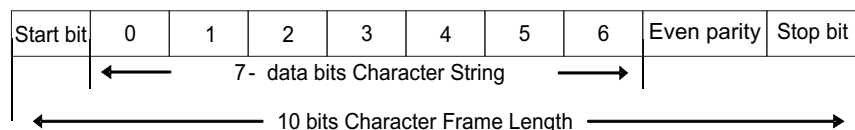
Character	'0'	'1'	'2'	'3'	'4'	'5'	'6'	'7'
ASCII code	30H	31H	32H	33H	34H	35H	36H	37H
Character	'8'	'9'	'A'	'B'	'C'	'D'	'E'	'F'
ASCII code	38H	39H	41H	42H	43H	44H	45H	46H

6.1 Communication Data Structure:

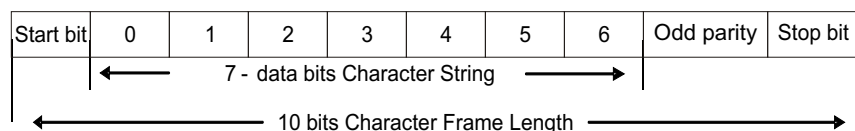
(1)7N2 For ASCII F03=0



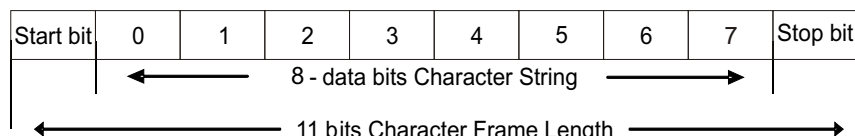
(2)7E1 For ASCII F03=1



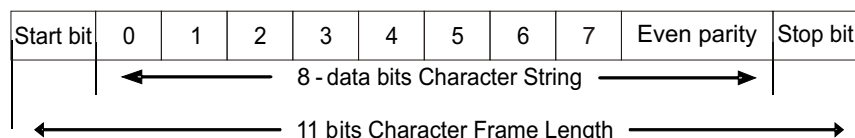
(3)7O1 For ASCII F03=2



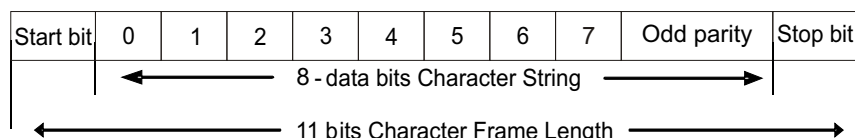
(4)8N1 For RTU F03=3



(5)8E1 For RTU F03=4



(6)8O1 For RTU F03=5



6.2 Data Format Frame

■ASCII Mode:

STX	Starting Character = ':' (3AH)
Address Hi	Communication Address:
Address Lo	
Function Hi	Function Code:
Function Lo	
DATA (n -1)	Data Content:
.....	
DATA 0	
LRC CHK Hi	LRC Check Code:
LRC CHK Lo	
END Hi	Ending Character:
END Lo	

■RTU Mode:

START	Keep the no input signal for ≥ 10 ms
Address	Communication Address: 8-bit binary address
Function	Function Code:-8bit binary address
DATA (n -1)	Data Content: n $\times$ 8bit Data, n $\leq$ 40(twenty 16-bit data)
.....	
DATA 0	
CRC CHK Low	CRC Check code:
CRC CHK High	16-bit CRC Check code consisting of 2 8-bit Binary
END	Keep the no input signal ≥ 10 ms

6.2.1 Communication Address (Address)

00H: Broadcast to all drivers;

01H: To driver with Address 01;

0FH: To driver with Address 15;

10H: To driver with Address 16, and so on, the maximal address can be

31(1EH).

6.2.2 Function Code (Function) and Data Content (Data Characters)

03H: Read the register;

06H: Write data to the register;

08H: Loop detection;

10H: Write several data in succession;

■ 03H: Read several data to register

Function Code 03H: Read register (maximally, twenty continuous data can be read at the same time)

For example: as for driver with Address 01H, two continuous data in register can be represented as follows: Starting register Address 2102H

1.ASCII Mode:

Inquiry Message Character String Format Response Message Character String Format:

STX	‘.’	STX	‘.’
Address	‘0’	Address	‘0’
	‘1’		‘1’
Function	‘0’	Function	‘0’
	‘3’		‘3’
Starting address	‘0’	Number of data (count by byte)	‘0’
	‘0’		‘4’
	‘1’	Content of starting Address 001DH	‘1’
	‘D’		‘7’
Number of data (count by word)	‘0’		‘7’
	‘0’		‘0’
	‘0’	Content of address 001EH	‘0’
	‘2’		‘0’
LRC Check	‘D’		‘0’
	‘D’		‘0’
END	CR	LRC Check	‘7’
	LF		‘1’

2.RTU Mode:

Inquiry Message Format:

Address	01H
Function	03H
Content of data address 001DH	00H
	1DH
Number of data(count by word)	00H
	02H
CRC CHK Low	54H
CRC CHK High	0DH

Response Message Format:

Address	01H
Function	03H
Number of data (count by byte)	04H
Content of data address 001DH	17H
	70H
Content of data address 001EH	00H
	00H
CRC CHK Low	FEH
CRC CHK High	5CH

■ Function Code 06H: Write data to register

For example: as for Driver with Address 01H, write 6000(1770H) to the internal setting parameter of driver 001DH

1.ASCII Mode:

Inquiry Message Format:

STX	‘:’
Address	‘0’
	‘1’
Function	‘0’
	‘6’
Data address	‘0’
	‘0’
	‘1’
	‘D’
	‘D’
Data content	‘1’
	‘7’
	‘7’
	‘0’
LRC Check	‘9’
	‘0’
END	CR
	LF

Response Message Format

STX	‘:’
Address	‘0’
	‘1’
Function	‘0’
	‘6’
Data address	‘0’
	‘0’
	‘1’
	‘D’
	‘D’
Data content	‘1’
	‘7’
	‘7’
	‘0’
LRC C heck	‘9’
	‘0’
END	CR
	LF

2. RTU Mode:

Inquiry Message Format:

Address	01H
Function	06H
Data address	00H
	1DH
Data content	17H
	70H
CRC CHK Low	17H
CRC CHK High	D8H

Response Message Format:

Address	01H
Function	06H
Data address	00H
	1DH
Data content	17H
	70H
CRC CHK Low	17H
CRC CHK High	D8H

■ Command Code: 08H, Communication Loop Test

This command is used to test the communication status between the controller device (usually PC or PLC) and drivers, and the drivers will send The data content received back to the controller device without any operation.

1. ASCII Mode:

Inquiry Message Format:

STX	‘:’
ADR 1	‘0’
ADR 0	‘1’
CMD 1	‘0’
CMD 0	‘8’
Data	‘0’
	‘0’
	‘0’
	‘0’
	‘0’
Data	‘1’
	‘7’
	‘7’
	‘0’
LRC Check	‘7’
	‘0’
END	CR
	LF

Response Message Format:

STX	‘:’
ADR 1	‘0’
ADR 0	‘1’
CMD 1	‘0’
CMD 0	‘8’
Data	‘0’
	‘0’
	‘0’
	‘0’
	‘0’
Data	‘1’
	‘7’
	‘7’
	‘0’
LRC Check	‘7’
	‘0’
END	CR
	LF

2.RTU Mode:

Inquiry Message Format:

ADR	01H
CMD	08H
Data	00H
	00H
Data	17H
	70H
CRC CHK Low	8EH
CRC CHK High	0EH

Response Message Format:

ADR	01H
CMD	08H
Data	00H
	00H
Data	17H
	70H
CRC CHK Low	8EH
CRC CHK High	0EH

■ Command Code: 10H, Write several data in succession

For example: Change the multiple speed setting of driver (Address 01H)

001DH=50.00(1388H) and 001EH=40.00(0FA0H)

1. ASCII Mode:

Inquiry Message Format:

STX	‘.’
ADR 1	‘0’
ADR 0	‘1’
CMD 1	‘1’
CMD 0	‘0’
Data Starting Address	‘0’
	‘0’
	‘1’
	‘D’
Data Quantity (Word)	‘0’
	‘0’
	‘0’
	‘2’
Data Quantity (Byte)	‘0’
	‘4’
First Data	‘1’
	‘3’
	‘8’
	‘8’
Second Data	‘0’
	‘F’
	‘A’
	‘0’
LRC Check	‘8’
	‘2’
END	CR
	LF

Response Message Format :

STX	‘.’
ADR 1	‘0’
ADR 0	‘1’
CMD 1	‘1’
CMD 0	‘0’
Data Starting Address	‘0’
	‘0’
	‘1’
	‘D’
Data Quantity (Word)	‘0’
	‘0’
	‘0’
	‘2’
LRC Check	‘D’
	‘0’
END	CR
	LF

2.RTU Mode:

Inquiry Message Format:

ADR	01H
CMD	10H
Data Starting Address	00H 1DH
Data Quantity (Word)	00H 02H
Data	04H
First Data	13H
	88H
Second Data	0FH
	A0H
CRC Check Low	B2
CRC Check High	1C

Response Message Format:

ADR	01H
CMD	10H
Data Starting Address	00H 1DH
Data Quantity (Word)	00H 02H
CRC Check Low	D1
CRC Check High	CE

6.3 Check Value:

■ Check Code (LRC Check) of ASCII Mode

Check code (LRC Check) is the total sum from of Address to the end of Data content.

For example: for the Check code of inquiry message in 3.3.1

01H + 03H + 21H + 02H + 00H + 02H = 29H, then take the complement of “2”, and we get D7H.

■ Check code (CRC Check) of RTU Mode

Check code is calculated from Address to the end of Data content. The Operation rules are as follows:

Step 1: Set 16 bit register (CRC register) = FFFFH.

Step 2: Perform “Exclusive OR” on the first 8-bit byte message instruction and lower 16-bit CRC register and save the value obtained to CRC register.

Step 3: Right Shift CRC register and set the most significant bit with “0”;

Step 4: Check the value after right shift: if it is “0”, save the new value obtained in Step 3 to CRC register, or, Exclusive OR A001H and CRC register, and then save the result to CRC register.

Step 5: Repeat Step 3~Step 4, finish the operation of all 8-bit;

Step 6: Repeat Step 2~Step 5, take the next 8-bit message instruction, until all message instructions have been calculated. Finally, the CRC register value is the check code of CRC. Note: The check code of CRC must be put in the check code of message instruction in an exchange matter

■ In C language, the following function, which requires two parameters, produces the CRC value.

Unsigned char data Index in message buffer

Unsigned char length Byte quantity in message buffer

This function returns CRC value in the form of unsigned integer.

unsigned int crc_chk(unsigned char data,unsigned char length)

```
{int j;
unsigned int reg_crc=0xffff;
while (length--){
reg_crc^=*data++;
for(j=0;j<8;j++){
if (reg_crc&0×01){/*LSB(b0)=1*/
reg_crc=(reg_crc>>1)^0xa001;
}else{
reg_crc=reg_crc>>1;
}
}
}
return reg_crc;
}
```

6.4 Definitions of Parameter Word Address in Communication Protocol

Definition	Parameter Word Address	Function Description
Internal Setting Parameters of AC motor Driver	0nnnH	“nnn” means the configurable parameter(Please refer to Appendix 1)
Orders for AC motor Driver	2000H	Bit0 0:STOP 1:RN
		Bit1 0:FWD 1:REV
		Bit2 0: Invalid 1:EF0
		Bit3 0: Invalid 1:RESET
		Bit4 0: Invalid 1:DO0
		Bit5 0: Invalid 1:DO1
	2001H	Bit6~15 Reserved
Monitoring of AC motor Driver Status	2100H	MODBUS Frequency order
		(Error code):
		01H=Uu1
		02H=(Reserved)
		03H=(Reserved)
		04H=SC
		05H=oC
		06H=ou
		07H=GF
		08H=FB
		09H=oH1
		0AH=oH2
		0BH=oL1
		0CH=oL2
		0DH=oL3
		0EH=EF0

Definition	Parameter Word Address	Function Description
Monitoring of AC motor Driver Status	2100H	0FH=EF2
		010H=EF3
		012H=EF4
		013H=EF5
		014H=EF6
		015H=SP
		016H=Spo
		017H=CE
		018H=rr
		019H=Rh
		01AH=oPr
	2101H	Pre-warning Code
		Bit0 UuWarning
		Bit1 ouWarning
		Bit2 OH1Warning
		Bit3 OL3Warning
		Bit4 BBWarning
		Bit5 EFWarning
		Bit6 SERR Warning
		Bit7 CALLWarning
		Bit8 OH3
		Bit9 CE
		Bit10 OPE0
		Bit11 OPE1
		Bit12 OPE2

Definition	Parameter Word Address	Function Description
Monitoring of AC motor Driver Status	2101H	Bit14~15 E=Reserved
	2102H	IO Status Code
		Bit0 S1
		Bit1 S2
		Bit2 S3
		Bit3 S4
		Bit4 S5
		Bit5 S6
		Bit6 S7
		Bit7 S8
		Bit8~9 Reserved
		Bit10 Y1
		Bit11 Y2
		Bit12 Y3
		Bit13 Y4
		Bit14~15 Reserved
	2103H	Running Status
		Bit0 In Running
		Bit1 Reversed Running
		Bit2 AC motor driver ready
		Bit3 Fault
		Bit4 Inching Status
		Bit5 Pre-Warning
		Bit6~7 Reserved
		Bit8 Running Mode Bit0

Definition	Parameter Word Address	Function Description	
Monitoring of ac motor Driver Status	2103H	Bit9	Running Mode Bit1
		Bit10	Running Mode Bit2
		Bit11	Running Mode Bit3
		Bit12	ENTER key is used for input when the frequency input
		Bit13~15	Reserved
	2104H	Setting Frequency	
	2105H	Output Frequency	
	2106H	Output Current	
	2107H	Output Voltage	
	2108H	Output Power	
	2109H	EDC Voltage	
	210AH	PID Feedback	
	210BH	Radiator Temperature	
	210CH	ROM Version	
	210DH	Fault History1	
	210EH	Fault History2	
	210FH	Fault History3	
	2110H	Fault History4	

■Additional Response for Communication error:

When driver is connected for communication, if an error occurs, the driver will respond with error code and set the most significant bit (bit7) of command code to "1". (i.e., Function code AND 80H) and respond to controller system to inform the occurrence of errors.

For example:

ASCII Mode:

Address	01H
Function	86H
Exception code	02H
CRC CHK Low	C3H
CRC CHK High	A1H

RTU Mode:

Address	01H
Function	86H
Exception code	02H
CRC CHK Low	C3H
CRC CHK High	A1H

■Definition of Error Code:

Error Code	Description
01	Function Code Error: function codes can be recognized by ac motor driver (03H,06H,08H,10H) by driver;
02	Data Address Error: The Address of data can not be recognized by ac motor Driver;
03	Data Content Value Error: Too large value of data content, which can not be recognized by driver;
04	Driver Fails to Handle: Driver fails to execute this command.

7.1 List of actions to protect

The AC motor driver itself has the functions of over-voltage, low voltage and over-current alarms and protection. Once a failure occurs, the protective actions will work, the AC motor driver will stop the output, the abnormal contact will act, and the free operation of motor will stop. Please refer to the abnormality causes and solutions according to the shown abnormality information of AC motor driver. The abnormality records will be kept in the interior storage unit of AC motor driver (which can record the latest 4 faults message), and can be read on the digital operation panel or by communication via parameter reading.

7.1.1 List of fault display

Fault	Description	detail	error correction
Uu1	Low voltage in main circuit	Low voltage of main circuit during running. Test voltsge: about 190V or lower for 200V grade, 380V or lower for 400V grade.	check power connection wire. Improve input voltage.
	Low voltage in control circuit	Low voltage of control circuit during running.	
	Contact error	The advance power transmitted of ac motor drive during running	
OC	Over current flow (OC)	AC motor driver output current over OC value which is about 250% of the rated current.	checkl motor coil resistance. prolong accelerate /retard time. check motor insulation. check with multimeter.

Fault	Description	detail	error correction
SC	Output short circuit (SC)	The output current of ac motor drive is more than the IGBT's current value of safety work	Check the three phase of output U.V.Wwhether short circuit
oU	Over vol tage (OU)	main circuit DC voltage over OU value test voltage: 200V grade: about 410V 400V grade: about 820V	Prolong retard time increase braking Unit.
oH1	Radiator overheat (Oh1)	The temperature of transistor radiato temperature is over allowed temperature $\geq$ OH1 test value) (about 95℃)	Check tne fan and the around temperature.
oH2	Radiator overheat (Oh2)	The temperature of transistor radiator temperature is over allowed value(radiator temperature $\geq$ OH2 test value)(about 105℃)	Check the fan and the around temperature.
oL1	Motor overload (OI1)	The output value of AC motor driver is over the motor overload capacity value	Check the setting of C18 whether is reasonable
oL2	AC motor drive Overload (OI2)	The output current of AC motor driver is over the motor overload capacity value	Reduce load capacity prolong accelerating time.
oL3	Over rotation momentof force testing (OI3)	The output current of AC motor driver is over rotation moment of force testvalue	Reduce load capacity prolong accelerating time.
EFLn	Error from RS485 general data wire	Error in control circuit	Check external control circuit.

Fault	Description	detail	error correction
EF2~8	Error from terminal Rs485 general data wire	Error in external control circuit	Check the input external,if the error happen in the terminal is unconnect,change the ac motor drive.
SPI	Current Fluctuate too much	The input power of AC motor driver is lack phase or have unstable in input voltage	Check power in voltage. Re-tighten the input terminal screw.Or adjusted basis SPI
SPO	Output lack phase	AC motor driver output lack phase.	1.Check output wire and check motor impedance. 2.Re-tighten the output terminal screw. 3.Adjust the SPO standard
◎CE	MEMOBUS transmittion error	RS485 control data not received normally.	Check transmittion equipment or signal
rH	Braking reactor component overheat	Exceed the braking reactor Temperature	Low down load capacity.
Err	Control circuit error 1(ERR)	The connection between AC motor driver and digital operator can't bulid in 5 seconds after power is on. MPU external component error(initial).	Input digital operator, connector. check control circuit wire. change control insert board.

Fault	Description	detail	error correction
EPF	EEPROM error (EPF)	AC motor driver control Component error.	Try the function of "A01 factory defaults",if it is still unable eliminated, please contact us.

7.1.2 List of alarm display

display	Content	illustration
Uu	Pressure enduring test	Not enough voltage tested when AC motor driver stops.
OU	Overvoltage in stopping	Main circuit EDC voltage surpass overvoltage test standard when AC motor driver stops.
OH1	Radiator overheat	Select test in environment of radiator temperature $\geq$ OH1 test standard, AC motor driver continue running.
OI3	Over rotation moment of force test	When the output current of AC motor driver is $>C24$ (over rotation moment of force test standard),select over rotation moment of force, AC motor driver continue running.
BB	Outside BB	External BB order input from control circuit terminal.
EF	Right/opposite running order error	It is OFF when right/opposite running order input over 500ms.
CALL	RS485 transmission waiting	In circumstance of A03(operation mode selection) ≥ 4 ,AC motor driver can not receive data flow from RS485 when power is on.
OH3	AC motor driver overheat alarm	AC motor driver overheat alarm signal is input from control circuit terminal.
CE	RS485 transmission error	Sellect continue running when RS485 transmission error data transmittion break down.

display	Content	illustration
EFF	The setting of the input multifunction function is incorrect	The input multifunction function(B01-B07) have one of the following setting fault: 1.Set more than 2 same defaults 2.17 and 18 are set in same time 3.24 and 27 are set in same time
VFF	V/F data setting error	A10-A16 (V/F data) setting error.
PAF	Parameter setting error	AC motor driver rated current $\times 0.1 > (C18)$ motor rated current or $C18 > \text{AC motor driver rated current} \times 2$ A37(jump Fre. 1) $\geq$ A38(jump Fre.2)-A39(jump Fre.extent) A35(output Fr.up limits) $<$ A36(output Fre.lower limits).

Notice!

The alarm won't make the failure contact act, and the AC motor driver will return to the previous operation status automatically after the failure is solved. The list above explains the various alarms

7.2 Reset Alarm

■ When a failure is detected from EC5000, the failure will be shown on the digital manipulator, and the abnormal contact will have output and the motor will slide to stop. Check the failure causes in the list below and take corrective measures.

■ If the mentioned inspection and corrective measures can't solve the problem, please directly contact with our company.

■ For restart, connect with the resetting input signal or press , or disconnect the power supply of the main loop for one time, to reset the failure status.

■ If you want to change the parameters in the failure indication, please press .

Notice!

When inputting the right/opposite operation order, the AC motor driver fails to receive the failure resetting signal. You must cut off the right/opposite operation order first, and then reset.

7.3 The Causes and Solutions for AC Motor Driver's faults

Malfunction or fault can be caused by reasons such as ways of operation, setting conditions, environment or the AC motor driver itself. If these causes are not eliminated or no measures are taken, the drive will end up and unable to operate normally.

(1) Measures against electromagnet noises and induction noises

If there's noise source near the AC motor driver, the noise may invade the AC motor driver through radiation or power line and cause faulty actions of control circuit, and even destroy AC motor driver. Naturally, one solution is to improve noise capability of AC motor driver, but that's not economic, let alone the limited range of improvement. So it's best to take measures outside it to avoid the interference.

1. Install surge killer on relay or contactor in order to restrain switching surge noises at on and off switching.

2. Try to shorten the wiring of control circuit or program control circuit, and separate it from main circuit wiring.

3. For circuits regulated to use shielded wire for wiring, wiring must comply with the wiring regulations. And if the wiring is too long, an isolation amplifier should be added.

4. The grounding terminal of AC motor driver should be grounded according to regulations, and the grounding should be separate and not shared with electric welding machine or power devices.

5. Add a noise filter on the input terminal of the AC motor driver to avoid noise invasion from the power line.

(2) Environment setup measures

AC motor driver is a device made up of electronic parts, and its admissible environment is described in the specifications in detail. If the

regulations cannot be followed, corresponding measures or solutions must be taken.

1.Avoid vibrations, and use vibration-proof pads when necessary. Make sure that the vibration is under regulation. Because of the effect of vibration on electronic parts equals to mechanical stress, it should not be taken for long or repeatedly, which may cause faults in the ac motor drive.

2.Avoid corrosive gases and dusty environment, both of which will cause electronic parts rust and bad contact, and what's more, insulation will be decreased due to moisture absorption and cause short circuit accidents. Regular measure is treating with paint and dust-proof, and in strict conditions, inner-pressure suited for clean air or self-protective whole sealing structures are adopted.

3.The temperature of the around environment should be appropriate, the life-span and reliability of electronic parts is affected by both too high and too low temperature. Take semiconductor module for example, once the regulated limit is exceeded, damage will be instant. Therefore, except equipping with cooler and sun-shade to keep the temperature in the regulated range, cleaning and spot check on air filter in the AC motor driver rack and the angles of cooling fan are also necessary. Besides, the internal microprocessor may stop working under extremely low temperature, space heaters must be equipped in low temperature areas.

4.No damp, and never should dewing occur. When AC motor driver needs to be left unused for a long time, be careful that dewing may occur as soon as air-conditioning is stopped. It would be best that the cooling device of the electric room has dehumidification function

(3)Prevent AC motor driver from interfering other machines

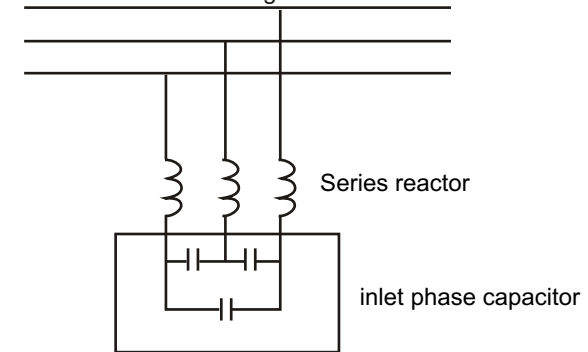
It is common that an AC motor driver interferes other machines at the same site, and this should be avoided through taking measures or solutions beforehand

Higher Harmonics Generated on Mains Side

During the operation of AC motor driver, higher harmonics are generated and flow towards the power supply, affecting the system adversely. Measures to be taken are as follows:

1.Separate the power supply system, and set specialized

2.Install a reactor on the AC motor driver side or introduce multiple current transforming in order to reduce the higher harmonics composition. As is shown in the figure:



3.If there's an inlet phase capacitor, a reactor should be cascaded in order to prevent too large higher harmonic current from flowing into it and destroy the capacitor by causing overheating.

Temperature Raise of the Motor

When the motor is used for variable speed operation, if it is synchronously ventilated induction motor, cooling effect is poor during low-speed operation and overheat may occur. Besides, AC motor driver's output wave contains higher harmonics, so both copper loss and iron loss all increase. Reference data should be prepared according to load status and operation range, and the following measures should be taken when necessary:

1.Replace the motor with separate power ventilated model or use one level higher capacity.

2.Use AC motor driver model motor instead to match AC motor driver.

3.Restrict the operation range and avoid operation in the low-speed zone transformer to transfer electricity to AC motor driver.

2.Install a reactor on the AC motor driver side or introduce multiple current transforming in order to reduce the higher harmonics composition. As is shown in the figure:

AC motor driver consists of multiple parts including electronic parts such as ICs, resistors, capacitors and transistors as well as cooling fans and relays and so on. These parts aren't permanently durable and cannot be used forever. Even if used under normal environment, once the life period has exceeded, faults are easily to occur. Therefore, preventive periodic check is necessary, in order to find out the parts with poor quality or those fall short of the standard, and eliminate the causes for AC motor driver malfunction. At the same time, the parts that have exceeded their life period could also be replaced, so as to ensure fine operation.

8.1 Daily Inspections

During power-up and operation, without taking away the cover, check the operation of AC motor driver with eye survey from outside and confirm that there's nothing abnormal. Usually, check the followings:

- whether the operation performance accord with the regulation
- whether the environment accord with the regulation
- whether keyboard panel display is normal
- whether without abnormal noises, vibrations and abnormal odor
- whether without abnormality such as overheat or change in color

8.2 Periodic Inspection

Before doing the periodic inspection, first stop operation, shut off power supply and take away the cover.

Even when the power supply of the AC motor driver is shut off, there's still charged voltage on the filter capacitors and it takes some time to discharge. In order to avoid the danger, be sure to wait until the charge indicator goes out and test with a voltmeter to ensure the voltage is lower than safe value ($\leq 25\text{Vdc}$) before the operation of inspection.

Notice!

1. For AC motor drivers $\leq 22\text{kW}$, wait 5 minutes after shutting down the power, and wait 10 minutes for those $\geq 30\text{kW}$. Not until the DC voltage between terminals N- and P+ is lower than DC25V could

examination operation with cover removed begin.

2. No one other than the appointed operators could perform maintenance and part replacement and other operations. (Metal objects such as watches and rings should be taken off before operation, and use tools with insulation in operation.)

3. Rebuilding the AC motor driver is absolutely forbidden.

4. Avoid electric shock and facility accident.

List of Periodic Inspection

Spot Check Period	Check site	Inspection Items	Inspection Method
Daily	Environment	Confirm environment temperature, humidity, vibration and whether there's dust, gas, oil mist and water drops and so on.	With eye survey and apparatus measuring
Daily		Are there any foreign bodies like tools or dangerous goods nearby?	With eye survey
Daily	Voltage	Are voltages of main circuit and control circuit both normal?	Measure with a multimeter
Daily	Keyboard Display Panel	Is the display clear?	With eye survey
Daily		Is any character missing?	
Half yearly	Mechanism Parts	Is there any abnormal sound or vibration?	With eye survey and hearing
Half yearly		Are the bolts (fasteners) loose?	Fasten
Half yearly		Is there any distortion and damage?	With eye survey
Half yearly		Is there color change due to overheat?	With eye survey

Spot Check Period	Cheek site	Inspection Items	Inspection Method
Half yearly	Mechanism Parts	Is it stained with dust or defacement?	With eye survey
Daily	Main Circuit	Have any bolts been loose and dropped off?	Fasten
Half yearly		Is there distortion, crack, damage or color changedue to overheat and aging in the machine and insulation?	With eye survey
Half yearly		Is it stained with dust or defacement?	With eye survey
Half yearly	Main Circuit: Terminals and Wiring	Is there color change and distortion due to overheat in the conductor?	With eye survey and hearing
Half yearly		Is there any damage and color change in the wire protection?	With eye survey
Daily		Is there any damage?	With eye survey
Half yearly		Is there any looseness between the bolts and the connector?	Fasten
Half yearly		Is there any odors and color change?	Smell and hearing
Half yearly		Is there color change. damaged and distortion due to corrosion?	With eye survey
Half yearly		Is there leakage and distortion of the capacitor?	With eye survey
Daily	Main Circuit: Terminal Blocks	Is there leakage,color change,crack and shell inflation?	With eye survey

Spot Check Period	Cheek site	Inspection Items	Inspection Method
Daily	Main Circuit: Terminal Blocks	Has the safety valve loose? Is there significant inflation in the valve?	With eye survey
Daily		Measure static capacity according to the need	Measure with a multimeter
Daily	Main Circuit: Filter Capacitor	Is there abnormal odor or crackle in the insulator due to overheat?	With eye survey
Daily		Is there any broken wire?	With eye survey, or open the connection at one end and measure with a multimeter
Daily	Main Circuit: Resistor	Is there abnormal noise of vibration or odor?	With hearing, eye survey and smelling
Daily	Main Circuit: Transformer and Reactor	Is there noise of vibration while operating?	With eye survey
Daily		Are the junctions well connected?	With eye survey
Half yearly	Main Circuit: Control PCB Connector	Is there abnormal noise or vibration?	With hearing, eye survey and turn with hand (must cut off the power)
		Are the bolts loose?	Fasten
		Is there color change due to overheat?	With eye survey
Half yearly	Cooling System: Cooling Fans	Is there any blockings or foreign bodies on the radiator and the air inlet and outlet?	With hearing

Notice!

Please wipe the pollutional areas with chemically neutral cleaning cloth. Sweep the dust with electric cleaner

Appendix A-1 Product Specifications

Product Standard Specifications Schedule

Model	Input Voltage	Power G/P(KW)	Output Capacity KVA	Output Current G/P(A)	Suited Motors G/P(KW)
EC500D4G23	Single/Three Phase 200V 50Hz	0.4/-	1.0/-	3.2/-	0.4/-
EC50D75G23	Single/Three Phase 200V 50Hz	0.75/-	2.0/-	6/-	0.75/-
EC501D5G23	Single/Three Phase 200V 50Hz	1.5/-	2.4/-	8/-	1.5/-
EC502D2G23	Single/Three Phase 200V 50Hz	2.2/-	3.7/-	11/-	2.2/-
EC50D75G43	Three Phase 400V 50Hz	0.75/-	2.6/-	3.4/-	0.75/-
EC501D5G43	Three Phase 400V 50Hz	1.5/-	3.7/-	4.8/-	1.5/-
EC502D2G43	Three Phase 400V 50Hz	2.2/-	4.2/-	6.2/-	2.2/-
EC503D7G43	Three Phase 400V 50Hz	3.7/-	6.6/-	8.2/-	3.7/-
EC504D0G05D5P43	Three Phase 400V 50Hz	4.0/5.5	10/11	11/14	4.0/5.5
EC505D5G07D5P43	Three Phase 400V 50Hz	5.5/7.5	11/14	14/18	5.5/7.5
EC507D5G0011P43	Three Phase 400V 50Hz	7.5/11	14/21	18/27	7.5/11
EC50011G0015P43	Three Phase 400V 50Hz	11/15	21/26	27/34	11/15
EC50015G18D5P43	Three Phase 400V 50Hz	15/18.5	26/34	34/41	15/18.5
EC518D5G0022P43	Three Phase 400V 50Hz	18.5/22	31/40	41/52	18.5/22
EC50022G0030P43	Three Phase 400V 50Hz	22/30	40/50	52/65	22/30
EC50030G0037P43	Three Phase 400V 50Hz	30/37	50/61	65/80	30/37

Model	Input Voltage	Power G/P(KW)	Output Capacity KVA	Output Current G/P(A)	Suited Motors G/P(KW)
EC50037G0045P43	Three Phase 400V 50Hz	37/45	61/73	80/96	37/45
EC50045G0055P43	Three Phase 400V 50Hz	45/55	73/98	96/128	45/55
EC50055G0075P43	Three Phase 400V 50Hz	55/75	98/130	128/165	55/75
EC50075G0090P43	Three Phase 400V 50Hz	75/90	130/153	165/185	75/90
EC50090G0110P43	Three Phase 400V 50Hz	90/110	153/170	185/224	90/110
EC50110G0132P43	Three Phase 400V 50Hz	110/132	170/211	224/260	110/132
EC50132G0160P43	Three Phase 400V 50Hz	132/160	211/230	260/302	132/160
EC50160G0185P43	Three Phase 400V 50Hz	160/185	230/260	302/340	160/185
EC50185G0220P43	Three Phase 400V 50Hz	185/220	260/340	340/450	185/220
EC50220G0250P43	Three Phase 400V 50Hz	220/250	340/360	450/470	220/250
EC50250G0280P43	Three Phase 400V 50Hz	250/280	360/390	470/520	250/280
EC50280G0315P43	Three Phase 400V 50Hz	280/315	390/460	520/605	280/315
EC50315G0350P43	Three Phase 400V 50Hz	315/350	460/520	605/640	315/350
EC50350G0400P43	Three Phase 400V 50Hz	350/400	500/565	640/690	350/400
EC50400G0450P43	Three Phase 400V 50Hz	400/450	565/630	690/775	400/450
EC50450G0500P43	Three Phase 400V 50Hz	450/500	630/750	775/860	450/500
EC50500G0560P43	Three Phase 400V 50Hz	500/560	750/840	860/950	500/560
EC50560G0630P43	Three Phase 400V 50Hz	560/630	840/925	950/1100	560/630

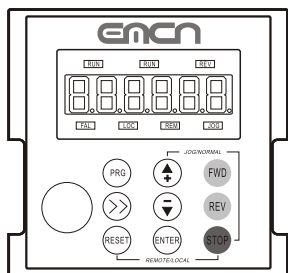
Appendix A-2 Product Technical Indexes

Series		EC5000
Input	Rated Voltage and Frequency	400V/50Hz/60Hz, Voltage:±15%; Frequency:±5%
		200V/50Hz/60Hz, Voltage:±15%; Frequency:±5%
Output	Permissible changed value	Three Phase: 400V (proportional to input voltage)
		Three Phase: 200V (proportional to input voltage)
Controlling Features	Control Method	SVPWM
	Control Mode	V/F Control / Current Vector Control
	Torque Feature	With torque compensation and slip compensation, start torque can reach 150% at 1.0Hz
	Frequency Control Range	0.1 ~ 400Hz
Controlling Features	Frequency Precision (Temperature Changing)	Digital Instruction: $\pm 0.01\%$ ($-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$)
		Analog Instruction: Max Frequency $\times 0.2\%$ Hz ($25^{\circ}\text{C} \pm 10\%$)
	Setting Resolution	Digital Instruction: 0.01Hz
		Analog Instruction: Max Frequency $\times 0.1\%$ Hz
	Output Resolution	0.01 Hz
	Overload Capability	Generic Model(G): 150% rating output current for 1min
		Blower/Pump Model(P): 120% rating output current for 1min
	Frequency Setting Signal	0 ~ 10V(20k Ω), 0 ~ 4 ~ 20mA (250 Ω)
Performance	Acceleration/Deceleration Time	0.0~3600 seconds (acceleration/deceleration time shall be set respectively)
	Braking Torque	About 20% without braking resistor, and about 125% with braking resistor.
	V/F Mode types	15 preset V/F modes and programmable V/F mode
	Overload Protection	Electronic thermal overload relay protection.

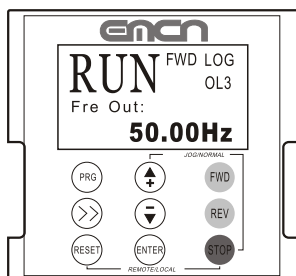
Series		EC5000
Performance	Instantaneous Over Current	General Model(G): About 250% AC motor driver rating current Blower/Pump Model(P): About 200% AC motor driver rating current
	Over Load	General Model(G): 150% rating output current for 1min before sliding stop Blower/Pump Model(P): 120% rating output current for 1min before sliding stop
	Over current	Motor stops sliding when the output voltage of rectifier exceeds 410V (200V grade) / 820V(400V grade).
	UnderVoltage	Motor stops sliding when the output voltage of rectifier drops down to 190V (200V grade) / 380V(400V grade) or lower.
	Instantaneous Power -Failure Compensation	Instant stop when instantaneous power-failure lasts for 15ms or longer. (Default setting) According to standard setting, if the power - failure is shorter than 2 seconds, continue operation.
	Heat Radiator	Thermistor protection, takes effect when temperature exceeds 105 $^{\circ}\text{C}$
Environment	Speed Loss Protection	Speed loss protection during acceleration, deceleration and constant speed operation
	Environment Temperature/Humidity	$-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$ 90%RH and lower (no dewing)
	Operation Place	No higher than altitude 1000m above sea level, indoor (no corrosive gas, liquid, no dust)
	Storage Temperature	$-20^{\circ}\text{C} \sim 60^{\circ}\text{C}$
International Certification	Vibration	Under 20Hz and below: 9.8m/s ² (1G) 20 ~ 50Hz: 5.88m/s ² (0.6G)
		

Appendix B-1 Optional Digital Operators and External Components

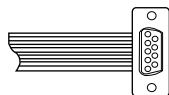
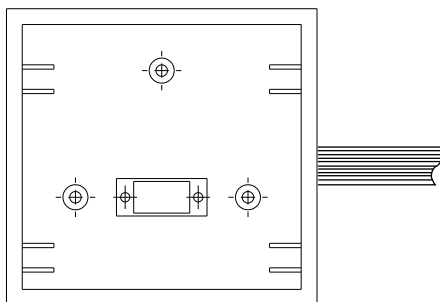
■ LED Operator PU-01



■ LCD Operator PU-02



■ External Component PUZ-01



Appendix B-2 Braking Resistor

Braking Resistor Selection schedule

AC Motor Driver Model	Resistor Specifications		Braking Torque%	Suited Motor /KW Model G	Suited Motor /KW Model P
	Power W	Resistance Ω			
EC500D4G23	80	200	125	0.4	-
EC50D75G23	100	200	125	0.75	-
EC501D5G23	300	100	125	1.5	-
EC502D2G23	300	70	125	2.2	-
EC50D75G43	80	750	125	0.75	-
EC501D5G43	300	400	125	1.5	-
EC502D2G43	300	250	125	2.2	-
EC503D7G43	400	150	125	3.7	-
EC504D0G05D5P43	500	125	125	4.0	5.5
EC505D5G07D5P43	500	100	125	5.5	7.5
EC507D5G0011P43	1000	75	125	7.5	11
EC50011G0015P43	1000	50	125	11	15
EC50015G18D5P43	1500	40	125	15	18.5
EC518D5G0022P43	4800	32	125	18.5	22
EC50022G0030P43	4800	27.2	125	22	30
EC50030G0037P43	6000	20	125	30	37
EC50037G0045P43	9600	16	125	37	45
EC50045G0055P43	9600	14	125	45	55
EC50055G0075P43	12000	10	125	55	75
EC50075G0090P43	18000	7	125	75	90
EC50090G0110P43	18000	7	125	90	110
EC50110G0132P43	18000	7	125	110	132
EC50132G0160P43	36000	3.5	125	132	160
EC50160G0185P43	36000	3.5	125	160	185
EC50185G0220P43	36000	3.5	125	185	220
EC50220G0250P43	48000	3	125	220	250

AC Motor Driver Model	Resistor Specifications		Braking Torque%	Suited Motor /KW Model G	Suited Motor /KW Model P
	Power W	Resistance Ω			
EC50250G0280P43	48000	3	125	250	280
EC50280G0315P43	48000	3	125	280	315
EC50315G0350P43	48000	3	125	315	350
EC50350G0400P43	48000	3	125	350	400
EC50400G0450P43	48000	3	125	400	450
EC50450G0500P43	48000	3	125	450	500
EC50500G0560P43	48000	3	125	500	560
EC50560G0630P43	48000	3	125	560	630

Notice!

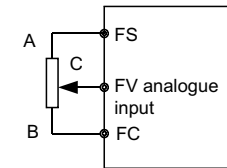
- 1.To implement fast braking, AC motor drivers of specs 400V grade, ≥ 18.5 KW and higher need to install a braking unit.
- 2.Choose the resistances and operation frequencies according to our factory setting.
- 3.If braking resistors and braking IGBTs are not used our company supply, then the AC motor driver or other devices damage, we will be of none responsibility.
- 4.Please take environment safety especially flammability into consideration during the installation of braking resistors.
- 5.If you want to change the resistance and power, please contact local agents.
- 6.You shall order separately if you need braking resistors and braking modules. Please contact local agents for details.

Appendix C-1 the given frequency and operation panel of the external potentiometer

1.The wiring diagram(1-1) of the external potentiometer terminals A、B、C, usually choose 5-10K potentiometer, we can adjust terminal C to judge the potentiometer.

Use the resistance of the multimeter to measure any two terminals A、B、C,the biggest resistance is terminal A、B,the left one is the terminal C which can judge the potentiometer.

2. Parameter setting: Choose the operation mode A03=2, the max frequency A11 (the corresponding frequency of 10V)



1-1

Appendix C-2 Two wire form: Use S1,S2,SC to compose the forward, stop, reverse.As shown 1-2

1. Choose terminals S1, S2
2. Parameter setting:
 - (1). The given frequency of external potentiometer and the external terminals at the start

Choose the operation mode A03=3, the max frequency A11 (the corresponding frequency of 10V),B01=0
 - (2) The given frequency of the panel and the external terminals at the start

LED panel

When F12=0,the frequency is setted by A27,B01=0, choose the operation mode A03=1;

When F12=1,the frequency is setted by panel potentiometer,B01=0, choose the operation mode A03=1;

LCD panel

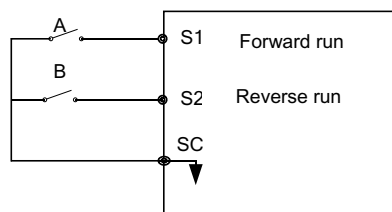
The frequency is set by A27,B01=0, choose the operation mode A03=1.

(3) Action description

When the switch A close,the inverter forwards;when it is opened,the inverter stops.

When the switch B close,the inverter reverses;when it is opened,the inverter stops.

When the switch A. B all close, the invalid inverter will show"EF".



1-2

Appendix C-3 Three wire form: Use S1,S2,S3,SC to compose the start, stop,and reversing. As shown 1-31.

1.Choose terminals S1, S2,S3

2. Parameter setting:

(1) The given frequency of external potentiometer and the external terminals at the start

Choose the operation mode A03=3,the max frequency A11,B01=1,F23=2.

(2) The given frequency of the panel and the external terminals at the start

LED panel

When F12=0,the frequency is set by A27,B01=1,choose the operation mode A03=1,F23=2;

When F12=1,the frequency is set by panel potentiometer,B01=1, A03=1,F23=2;

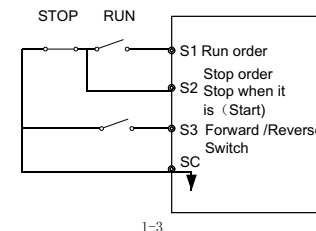
LCD panel

The frequency is set by A27,B01=1, A03=1,F23=2;

3.Action description

When trigger S1,the inverter starts; trigger S3, the inverter reverse operation

When press STOP, the inverter stops.



Appendix C-4 The given frequency of panel and panel start

1.Use panel directly to achieve forward, reverse and stop function

2.Parameter setting:

LED panel:

When F12=0,the frequency is set by A27,A03=0

When F12=1,the frequency is set by panel potentiometer,A03=0

LCD panel:

The frequency is set by A27,A03=0

Appendix C-5 The water supply with constant pressure

At 1.6 Mpa range table, the objective pressure value of 0.4 Mpa, for example

Parameter setting:A03=1,D01=1,D12=0(Without auxiliary pump, if there are auxiliary pump,the largest number is 2),B15=1(SW1-1 is on,the feedback signal is current signal, If a meter of the feedback signal is set to 0, 0-10 v,SW1-1 is OFF).

According to the formula:(Setting frequency/Max frequency)=

Objective pressure/Meter range

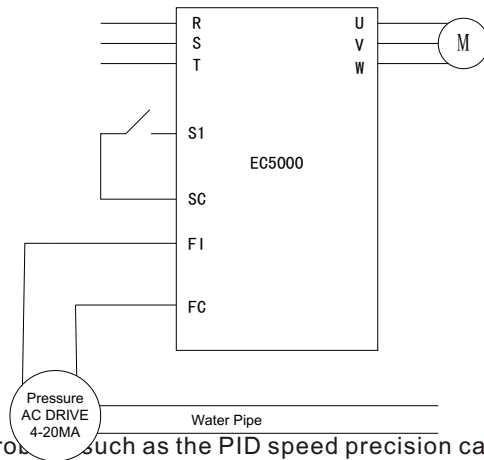
0.4/1.6=A27/A11,When A11=50.00Hz,get the target value A27=12.5Hz.

A36=20%,D17=95%,D18=30s,D19=80%,D20=20s(These values all can modify according to the real situation).

Running: Close S1, the inverter start running.

When the PID feedback value $> ((A27/A11) * D17 = 0.25 * 95 = 23.75)$, the output frequency will reduce. When it is reach the min frequency $(A36 * A1)$, if the PID feedback is still $>$ the objective value, then the time will exceed D18, the inverter will be dormancy.

When the PID feedback value $< ((A27/A11) * D19 = 0.25 * 80 = 20)$, the time will exceed D20, the inverter will wake up.



About the problem such as the PID speed precision can be adjusted according to the site situation D02-D11 related parameters